

# FLORA OF PANAMA

## PART II

### CYCADACEAE

Undershrubs or small trees of palm-like or fern-like habit. Stems underground to 10 m. or more in height, simple or rarely branched, disproportionately thick and fleshy, very rough with the persistent bases of fallen leaves. Leaves borne in a dense cluster at the crown of the stem, pinnately compound and usually massive. Staminate and ovulate strobili produced apically, both more or less woody and cone-like (except the ovulate in *Cycas*, which resembles a cluster of furry miniature leaves with marginal ovules toward the base); the microsporangia numerous, inferior; the ovules naked, usually paired, pendulous, somewhat drupe-like in fruit.

#### 1. ZAMIA L.

ZAMIA L. Sp. Pl. 1659. 1753; Schuster in Engl. & Diels, Pflanzenreich 4<sup>1</sup>:132. 1932.

*Palma-Filix* Adans. Fam. Pl. 2:21. 1763.

*Aulacophyllum* Regel, Gartenfl. 25:140. 1876.

*Palmifolium* O. Ktze. Rev. Gen. 2:803. 1891.

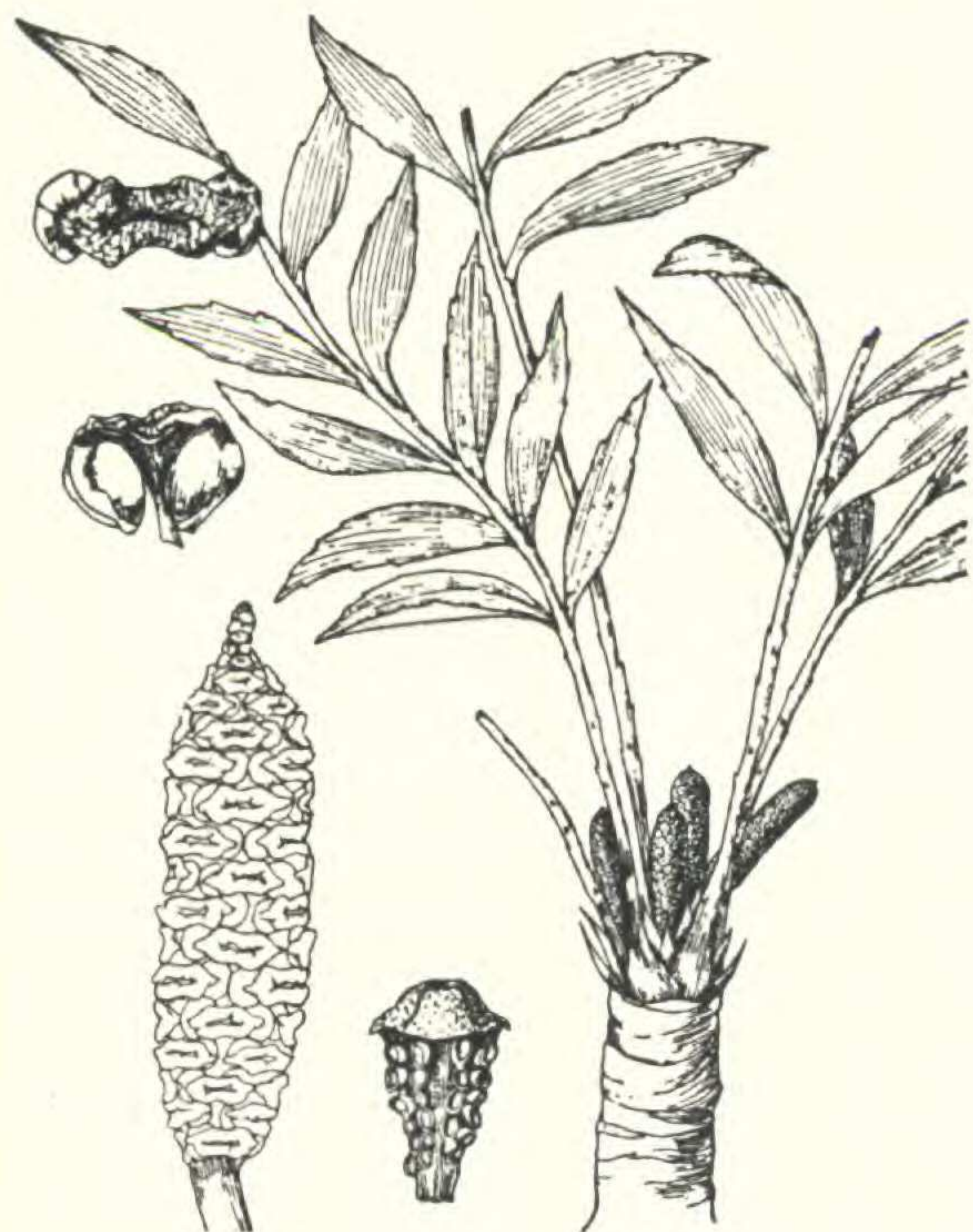


Fig. 1. *Zamia Skinneri*

Low stout undershrubs. Stems thick, cylindrical, wholly underground to nearly 1 m. tall. Leaves pinnate, the pinnae thickly coriaceous, many-nerved, articulated to the rachis. Both staminate and ovulate strobili cone-like, the sporophylls peltate, woody, truncate-pyramidal, hexagonal or subquadrate.

1. ZAMIA SKINNERI Warscz. in Otto & Dietr. Allg. Gartenz. 19:146. 1851; Schuster, loc. cit. 141. 1932.

*Zamia pseudoparasitica* Yates, in Seem. Bot. Voy. Herald 2:202. 1854; Schuster, loc. cit. 142. 1932.

*Zamia chigua* Seem. loc. cit. 201. pl. 43. 1854; Schuster, loc. cit. 141. 1932.

*Zamia Lindleyana* Warscz. in Wendl. Ind. Palm. 53. 1854.

*Zamia Roezlii* Regel in Linden, Cat. 10. 1873.



*Aulacophyllum Skinneri* (Warscz.) Regel, Gartenfl. 143. 1876.

*Aulacophyllum Roezli* Regel, loc. cit. 141. 1876.

*Aulacophyllum Ortgiesii* Regel, loc. cit. 1876.

Leaves about 1 m. long, the rachis relatively stout, smooth, or aculeolate; pinnae 2-13, narrowly to broadly lanceolate, opposite or alternate, 10-60 cm. long, 1.5-9.0 cm. broad, narrowed abruptly and unequally toward the rachis, acuminate and usually obscurely spinulose-dentate toward the tip. Staminate strobili elongate-cylindrical, 4-15 cm. long, 1.0-2.5 cm. thick, the peduncle stout, 2-12 cm. long; ovulate strobili cylindrical, 5-12 cm. long, 3-4 cm. thick, ferruginous-tomentulose, the peduncle stout, 2-7 cm. long.

Guatemala to Peru; in Panama found in forests upon both coasts, ascending to 300 m. in Coclé. The plants are found separately or in dense colonies. Infrequent.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart 179*. CANAL ZONE: Santa Rita Trail, *Cowell 165*; Río Pequení, *Woodson, Allen & Seibert 1586*. COCLÉ: El Valle de Antón, *Pring & Woodson s. n.* DARIÉN: Marraganti, *Williams 682*; Yaviza, *Clayton s. n.*

The root of *Z. Skinneri* is highly poisonous, and all parts of the plant exude an abundant gelatinous compound when cut or broken. The published species of *Zamia* are numerous, but are indefinite in outline and have been very unsatisfactorily treated by monographers, notably Schuster. It is impossible, therefore, to tell with certainty whether the genus is monotypic in Panama, as treated here, or whether other valid entities are involved.

The Oriental genus *Cycas* frequently is encountered in gardens.

## TAXACEAE

### 1. PODOCARPUS L'Her.

PODOCARPUS L'Her. ex Pers. Syn. Pl. 2:580. 1807.

*Nageia* Gaertn. Fruct. & Sem. 191. 1788, in part.

Shrubs to tall trees. Leaves spiral (in Panama), laminate, coriaceous, mucronate. Strobili dioecious: the staminate terminal or in the axils of the upper leaves, solitary or clustered, cone-like, sporophylls spiral, each bearing 2 microsporangia; the ovulate a small bracted spike bearing 1-2 terminal, inverted, naked ovules. Fruit drupaceous, usually fairly large.

1. PODOCARPUS ALLENII Standl. in Woodson & Schery, Ann. Missouri Bot. Gard. 28:409. 1941.

Large trees attaining 35 m. or more in height, the trunk as much as 1.5 m. in diameter at the base, with reddish-brown rimose bark. Leaves spiral, not greatly crowded, oblong-lanceolate, acuminate, rather gradually attenuate at the base, heavily coriaceous, with a prominent midrib, the adult 3-4 cm. long, the juvenile much longer and less coriaceous, 12-14 cm. long.

Panama, in mountain forests.

BOCAS DEL TORO: exact locality lacking, *Cox s. n.* COCLÉ: El Valle de Antón, *Allen 2298*. PANAMÁ: Cerro Campana, *Allen 2424*, *Allen 2437*.



Doubtfully distinguished from *P. oleifolius* Don, which ranges from Costa Rica to Peru. Mr. Allen reports the popular name as *Quabau*, and states that the natives use the smaller branches in the building of houses.

## TYPHACEAE

### 1. TYPHA L.

TYPHA L. Sp. Pl. 971. 1753.

Massive semiaquatic perennial herbs with extensive fleshy rhizomes. Leaves elongate, flat, equitant. Flowering stems elongate, terete; flowers monoecious, very numerous in two adjacent dense, cylindric spikes, the staminate above the pistillate, each usually subtended by a reduced, spathe-like leaf; perianth reduced to bristles or hairs; ovary stipitate, 1-2-celled.

1. TYPHA ANGUSTIFOLIA L. Sp. Pl. 971. 1753.

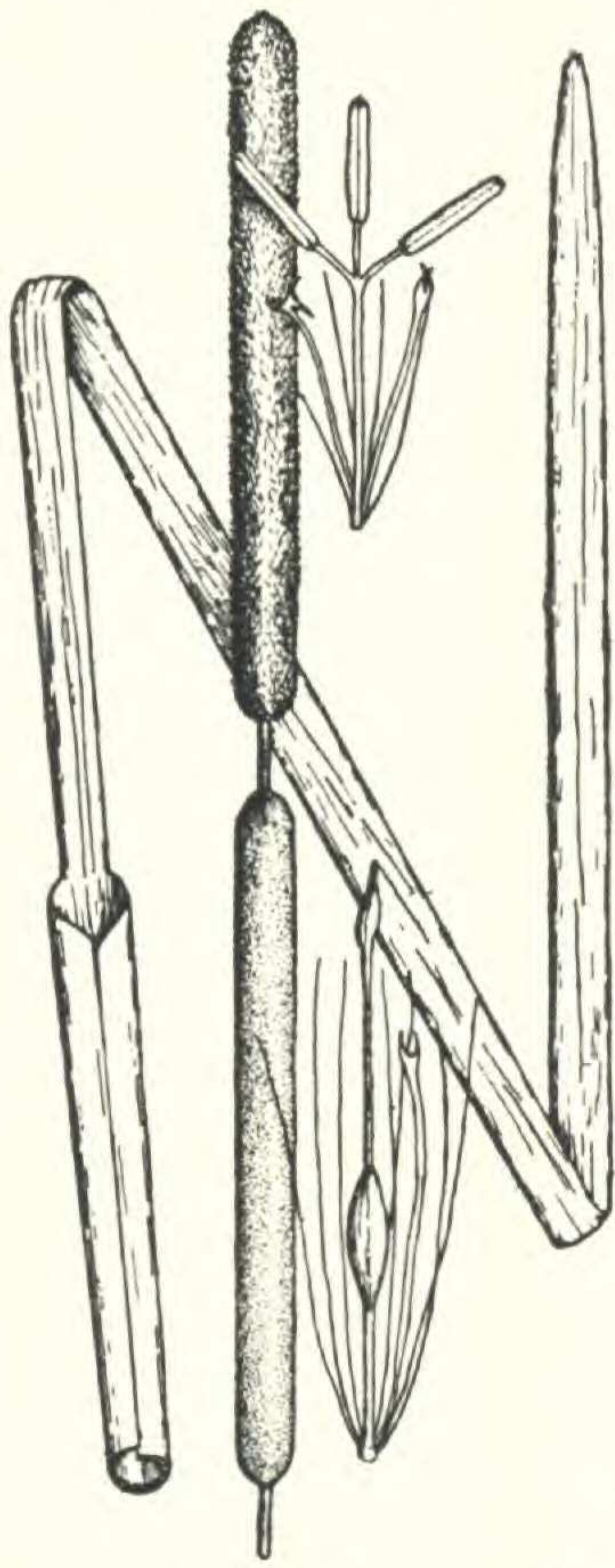


Fig. 2 *Typha angustifolia*

Plants 1-3 m. tall. Leaves narrowly ensiform, 0.3-1.0 cm. broad. Staminate and pistillate spikes of the inflorescence usually separated by a portion of naked peduncle, the pistillate less than 2 cm. in diameter; pistillate flowers usually having hair-like bractlets with dilated tips.

Very widely distributed in both hemispheres throughout the world, frequenting marshes and sloughs.

BOCAS DEL TORO: near Almirante, Woodson & Schery s. n. CANAL ZONE: Gatún Lake, Killip 12186; Frijoles, Standley 31490; Matachín to Las Cascadas, Cowell 346.

Graebner's account of Typhaceae (in Engl. Pflanzenreich 4<sup>8</sup>:1-16. 1900) recognizes a most confusing array of species, subspecies, variety, lusus and proles segregation from which it appears unprofitable, if not impossible, to disentangle the complete bibliography of our Panama plant.

*Typha angustifolia*, the Narrowleaf Cat-tail of the United States, is known under the name of *Tule*, *Tule de Balsa*, *Enea*, and *Espadaña*. According to Standley (Fl. Costa Rica 1:66. 1937), the fluffy "wool" from the spikes is sometimes used for stuffing pillows and cushions.

The POTAMOGETONACEAE probably are represented in the streams and ponds of highland Panama, but have not as yet been collected. *Potamogeton foliosus* Raf. is reported from Costa Rica by Standley (Fl. Costa Rica 1:66. 1937). The plants are aquatics with usually narrow, submerged or floating leaves and small spikes of minute green flowers.



## ALISMACEAE

Annual or perennial, acaulescent, aquatic or marsh herbs. Leaves basal, usually cordate or sagittate. Flowering scapes erect or floating, simple or branched. Flowers perfect or unisexual, whorled, regular, borne in terminal racemes or panicles. Sepals 3, separate, green, persistent. Petals 3, separate, deciduous, white or pink. Stamens 6 or more, the filaments separate. Carpels separate, few or numerous, 1-celled, containing 1 to several ovules; fruit a cluster of achenes.

- a. Flowers all perfect ..... 1. ECHINODORUS  
 aa. Flowers polygamous, monoecious or dioecious, the lower perfect or pistillate, the upper staminate.  
   b. Lower flowers perfect ..... 2. LOPHOTOCARPUS  
 bb. Lower flowers pistillate ..... 3. SAGITTARIA

## 1. ECHINODORUS L. C. Rich.

ECHINODORUS L. C. Rich. Mém. Mus. Paris 1:365. 1815; Small, N. Am. Fl. 17<sup>1</sup>:45. 1909.

*Helianthium* Engelm. ex Britton, Man. 54. 1905; Small, loc. cit. 1909.

Annual or perennial, usually acaulescent, marsh herbs. Leaves erect or ascending, narrow or broad, cordate or attenuate at the base. Flowering scapes generally surpassing the leaves, simple or branched, bearing 1 to numerous whorls of flowers, the pedicels short or virtually lacking. Flowers all perfect; sepals 3, green; petals 3, white or pink; stamens few or numerous; carpels numerous; fruit an achene.

- a. Plants very small, about 3–15 cm. tall; leaves linear to narrowly elliptic, not cordate; inflorescences simple, bearing 1–2 clusters of flowers. I. E. TENELLUS  
 aa. Plants large, 1 m. tall or more; leaves broadly cordate; inflorescences usually branched at the base, bearing numerous clusters of flowers.  
   b. Flowers distinctly pedicellate, at least in fruit; inflorescences simple or sparingly branched at the base.  
   c. Sepals not accrescent, reflexed from the fruit-head; pedicels and petioles muricate ..... 2. E. MURICATUS  
   cc. Sepals accrescent and enveloping the fruit-head; pedicels and petioles not muricate ..... 3. E. LONGIPETALUS  
 bb. Flowers sessile or virtually so; inflorescences paniculately branched. 4. E. BRACTEATUS

## 1. ECHINODORUS TENELLUS (Mart.) Buch. Abh. Nat. Ver. Bremen 2:18. 1868.

*Alisma tenellum* Mart. ex R. & S. Syst. 7:1600. 1830.

*Echinodorus parvulus* Engelm. in Gray, Man. 438. 1856.

*Helianthium tenellum* (Mart.) Britton, Man. 54. 1905.

*Helianthium parvulum* (Engelm.) Small, N. Am. Fl. 17<sup>1</sup>:45. 1909.

Plants 3–15 cm. tall. Leaves linear to narrowly elliptic, 1–3 cm. long, gradually narrowed into the elongate petioles. Flowering scapes solitary or clustered, about as long as the leaves or longer. Flowers 2–8, the pedicels 0.05–0.2 cm. long, reflexed in fruit; sepals and petals orbicular, about 0.2 cm. long. Fruit-heads 0.3–0.4 cm. in diameter, enclosed by the persistent sepals; achenes 0.01–0.015 cm. long.



Northeastern United States to Brazil and Paraguay, in wet meadows and pond margins.

CHIRIQUÍ: El Boquete, Killip 3618. COCLÉ: Penonomé, Williams 246.

2. *ECHINODORUS MURICATUS* Griseb. Bonplandia 6:11. 1858.

*Echinodorus macrophyllus*  $\beta$ . *muricatus* (Griseb.) Micheli, in DC. Monogr. 3:50. 1881.



Fig. 3. *Echinodorus muricatus*

Plants stout, 1 m. tall or more. Leaves cordate, broadly ovate to sub-reniform, obtuse, 3–4 dm. long; petioles elongate, muricate. Flowering scape simple or sparingly branched at the base, bearing numerous sparse whorls of pedicellate flowers, strongly muricate; pedicels 1.5–2.5 cm. long, muricate; sepals broadly ovate to sub-orbicular, 0.5–0.6 cm. long; petals white, 1.0–1.5 cm. long.

Panama to the Guianas, in wet meadows and along pond and stream margins.

CHIRIQUÍ: Boquete, Woodson & Schery 754; Davidson 691. COCLÉ: between Las Margaritas and El Valle, Woodson, Allen & Seibert 1736; El Valle de Antón, Seibert 490; Hunter & Allen 381.

*E. muricatus* ordinarily is treated as a variety of *E. macrophyllus* (Kunth) Micheli. In Panama, however, the entity is so uniform in the muricate surface of the petioles and peduncles that it is the most easily recognized of the genus.

3. *ECHINODORUS LONGIPETALUS* Micheli, in DC. Monogr. 3:60. 1881.

*Echinodorus punctatus* Micheli, loc. cit. 59. 1881.

*Echinodorus tunicatus* Small, N. Am. Fl. 17<sup>1</sup>:48. 1909.

Plants about 1 m. tall. Leaves ovate, deeply cordate, obtuse at the apex, 1–4 dm. long; petioles elongate. Flowering scape simple or branched sparingly at the base, bearing numerous rather distant whorls of flowers; pedicels 1.0–2.5 cm. long, reflexed in fruit; sepals ovate-reniform, 0.5 cm. long, accrescent and enveloping the fruit-head; petals 0.55–0.6 cm. long.

Panama to Brazil and Paraguay, in swamps and wet fields.

DARIÉN: Marragantí, Williams 991. PANAMÁ: Río Tecúmen, Standley 29403; Juan Díaz, Standley 30506; Matías Hernández, Pittier 6894.

4. *ECHINODORUS BRACTEATUS* Micheli, in DC. Monogr. 3:59. 1881.

Plants 1.5–2.0 m. tall. Leaves broadly ovate, broadly cordate, acute or shortly



acuminate at the apex, 25–35 cm. long; petioles elongate. Flowering scape paniculately branched, bearing numerous whorls of sessile or subsessile flowers; sepals broadly ovate, 0.4–0.5 cm. long, reflexed in fruit; petals 1.0–1.5 cm. long.

Panama, in moist fields and sloughs.

CANAL ZONE: Chagres, *Fendler 435*; Paraiso, *Pittier 2531*. COLÓN: Cativeal, *Standley 30444*. PANAMÁ: Río Tecúmen, *Standley 26724*.

## 2. LOPHOTOCARPUS T. Durand

LOPHOTOCARPUS T. Durand, *Index Gen. Phan.* 10. 1888; *Small, N. Am. Fl.* 17<sup>1</sup>:48. 1909.

*Lophiocarpus* Miq. *Fl. Arch. Ind.* 1<sup>2</sup>:50. 1870, non Turcz.

Annual or perennial aquatic herbs with floating, cordate leaves. Flowering scapes simple, bearing several whorls of flowers toward the tip, the lower perfect, the upper staminate. Sepals 3, green; petals 3, white; stamens 9–15; carpels numerous.

1. LOPHOTOCARPUS GUYANENSIS (HBK.) J. G. Smith, *Rep. Missouri Bot. Gard.* 6:61. 1894.

*Sagittaria guyanensis* HBK. *Nov. Gen. & Sp.* 1:250. 1816.

*Echinodorus guyanensis* (HBK.) Griseb. *Fl. Brit. W. Ind.* 505. 1864.

*Lophiocarpus guyanensis* (HBK.) Micheli, in DC. *Monogr.* 3:62. 1881.

Leaves floating, broadly oval to suborbicular, cordate-sagittate, rounded at the apex, 4–7 cm. long; petioles elongate. Flowering scapes shorter than the petioles, bearing the rather few flowers at the tip; sepals ovate, 0.6–0.8 cm. long; petals white, slightly exceeding the sepals.

Mexico to Trinidad, Brazil, and Paraguay, in marshes and ponds.

COCLÉ: Aguadulce, *Pittier 4981*. PANAMÁ: Pacora, *Woodson, Allen & Seibert 729*; Río Tecúmen, *Standley 26652*; Juan Franco, *Standley 27791*; Juan Díaz, *Killip 3260*.

## 3. SAGITTARIA L.

SAGITTARIA L. *Sp. Pl.* 993. 1753; *Small, N. Am. Fl.* 17<sup>1</sup>:50. 1909.

Perennial, acaulescent, marsh or aquatic herbs with thickened fleshy rhizomes. Leaves erect or floating, sagittate or attenuated at the base, the submerged frequently without blades. Inflorescences simple or branched, bearing numerous whorls of 3 flowers, the lower usually pistillate and the upper usually staminate; sepals 3, green; petals 3, white.

1. SAGITTARIA LANCIFOLIA L. *Pl. Jam. Pug.* 27. 1759.

Plants emersed or partially submerged, 4–20 dm. tall. Leaves erect or ascending, lanceolate to elliptic, attenuate at base and apex, 1–4 dm. long, usually shorter than the elongate petioles. Inflorescences usually longer than the leaves, simple or branched, bearing few to numerous whorls of flowers; pedicels ascending, 1.5–3.0 cm. long; sepals ovate, 0.6–1.0 cm. long, reflexed in fruit; petals 0.8–1.3 cm. long, white.



Florida and Texas to Mexico, Central and South America and the Antilles, in wet fields, ponds, and stream margins.

BOCAS DEL TORO: Isla Colón, *von Wedel* 35. CANAL ZONE: Miraflores Lake, *Hunter & Allen* 773; Gigante Bay, *Dodge* 3497; Barro Colorado Island, *Kenoyer* 101; between Corozal and Ancón, *Pittier* 2163.

## BUTOMACEAE

### 1. LIMNOCHARIS H. & B.

LIMNOCHARIS H. & B. Pl. Aequin. 1:116. 1807; Nash, N. Am. Fl. 17<sup>1</sup>:63. 1909.

Perennial, lactescent, aquatic or marsh plants, acaulescent from a mass of fleshy fibrous roots. Leaves narrowly lanceolate to elliptic, attenuate or rarely somewhat cordate at the base; petioles elongate and sheathing at the base. Inflorescences simple, umbellate, supported on a naked scape shorter than the leaves. Flowers perfect, pedicellate; sepals 3, greenish-yellow; petals 3, yellow; stamens numerous, the outermost sterile; carpels 15–20, laterally compressed, more or less united, thickened on the back, the sides delicately membranaceous in fruit, containing numerous seeds, dehiscent ventrally.

1. LIMNOCHARIS FLAVA (L.) Buch. Abh. Nat. Ver. Bremen 2:2. 1868.

*Alisma flava* L. Sp. Pl. 343. 1753.

*Damasonium flavum* (L.) Mill. Gard. Dict. ed. 8. 1768.

*Limnocharis emarginata* H. & B. Pl. Aequin. 1:116. 1807.

*Limnocharis Plumieri* L. C. Rich. Mém. Mus. Paris 1:374. 1815.

*Limnocharis Laforesti* Duchas. ex Griseb. Bonplandia 6:11. 1858.

*Limnocharis flava* var. *minor* Micheli, in DC. Monogr. 3:90. 1881.

*Limnocharis mattogrossensis* O. Ktze. Rev. Gen. 3<sup>2</sup>:324. 1893.



Fig. 4. *Limnocharis flava*

Leaves basal, narrowly lanceolate to ovate, attenuate or cordate at the base, 1–2 dm. long, somewhat shorter than the petioles. Flowering scapes somewhat shorter than the petioles; umbels bearing 3–15 mediocre yellow flowers; pedicels stout, 2–4 cm. long; sepals greenish or yellowish, about 1 cm. long, accrescent and enveloping the fruiting head; petals somewhat surpassing the sepals.

Mexico to southern Brazil and the Antilles, in wet fields, marshes and pond margins.



CANAL ZONE: near Panama City, *Pittier 2554*. COCLÉ: Aguadulce, *Pittier 4836*. HERRERA: Pesé, *Allen 810*. PANAMÁ: Sabanas, *Standley 25940*; Río Tecúmen, *Standley 26712*; Las Cruces Trail, *Standley 29091*; Chepo, *Pittier 4679*.

Standley (Fl. Barro Colorado Isl. 20. 1933) cites *Hydrocleis nymphoides* (H. & B.) Buch. doubtfully from Barro Colorado Island (*Shattuck 401*): "The collection consists of small sterile plants referable to this family but of uncertain generic and specific position. Further material is necessary to determine their status." *Hydrocleis* sometimes is placed in the Hydrocharitaceae.

## TRIURIDACEAE

### 1. SCIAPHILA Blume

SCIAPHILA Blume, *Bijdr.* 514. 1825; Giesen, in Engl. & Diels, *Pflanzenreich* 4<sup>18</sup>:30. 1938.

*Aphylleia* Champ. in *Calcutta. Jour. Nat. Hist.* 7:463. 1847.

Small colorless or purplish saprophytic herbs. Leaves alternate, reduced to narrow scales. Inflorescence terminal, racemose, bearing few to numerous small, monoecious, hermaphrodite or unisexual flowers. Perianth campanulate, segments virtually uniform, 4–10; stamens 2–6; carpels numerous, free; staminodia and pistillodia lacking.

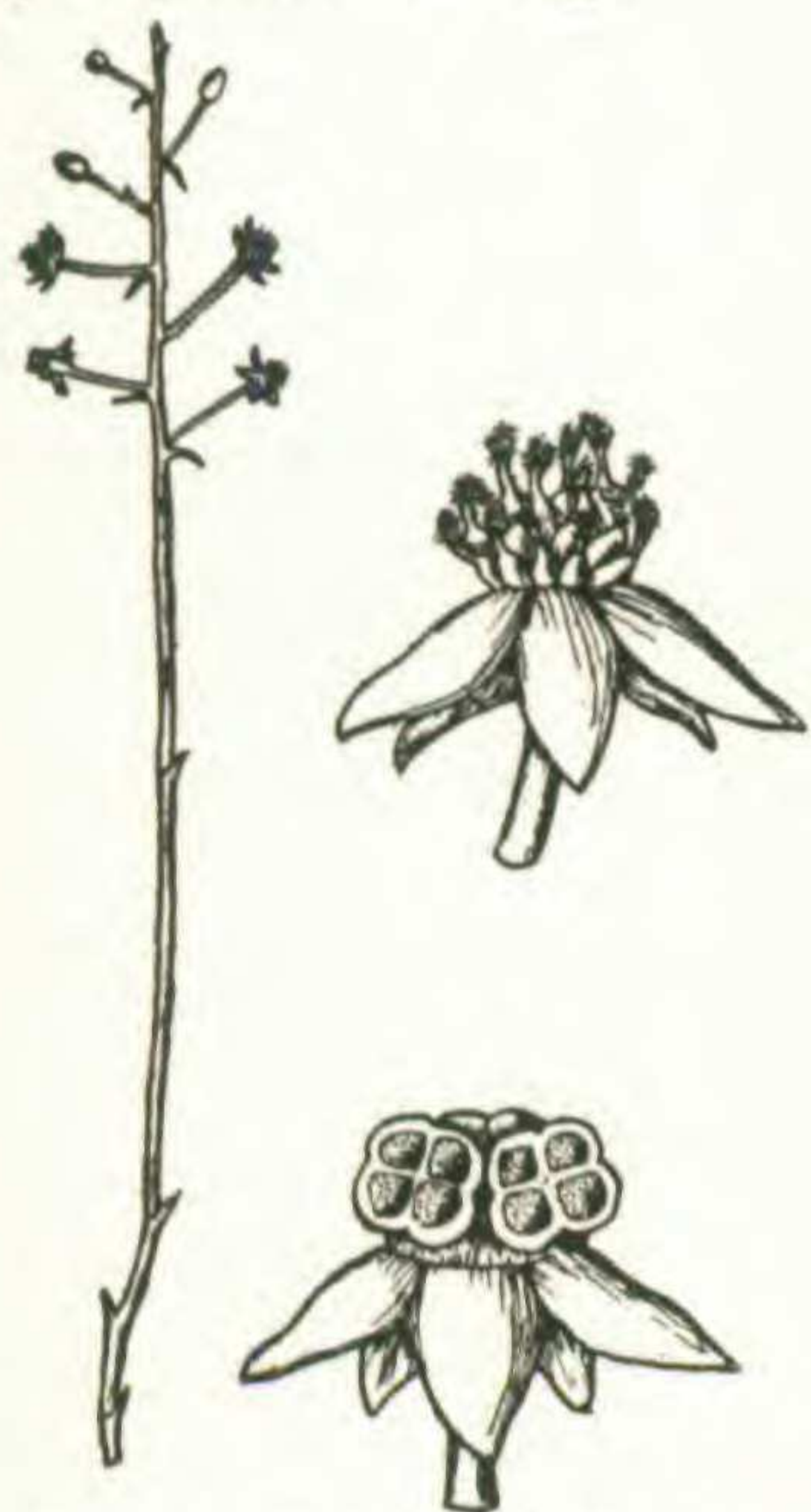


Fig. 5. *Sciaphila albescens*

1. SCIAPHILA ALBESCENS Benth. in Hook. *Jour. Bot.* 7:11. 1855.

*Sciaphila panamensis* Blake, *Proc. Biol. Soc. Wash.* 38:36. 1925.

Plants slender, 8–20 cm. tall, the stem usually simple. Leaves few, reduced to narrow scales. Racemes bearing 10–20 small purplish flowers. Staminate flowers about 0.4–0.5 mm. in diameter, perianth segments 6, rarely 5, ovate, exappendiculate, stamens 3, rarely 2, sessile; pistillate flowers about 0.5–0.6 mm. in diameter, perianth segments 6.

Panama to northern Brazil, in moist forests.

SAN BLAS: forests around Puerto Obaldía, *Pittier 4290*.

The genus *Triuris*, with dioecious flowers and long-caudate perianth segments, has been collected in Guatemala and Colombia, and is to be expected in Panama.

## GRAMINEAE

BY JASON R. SWALLEN

Flowers perfect (rarely unisexual), arranged in spikelets consisting of a shortened axis (rachilla) and 2 to many 2-ranked bracts, the lowest two (glumes, rarely one or both obsolete) empty, each succeeding one or more (lemmas) bearing



in their axils a single flower (one to few of the lower lemmas sometimes barren, and the upper one or more often reduced and sterile), and between the flower and rachilla a 2-nerved bract (palea), the lemma, palea, and included flower constituting the floret; stamens 1 to many, usually 3, with delicate filaments and 2-celled anthers; pistil 1, with a 1-celled 1-ovuled ovary, 2 (rarely 1 or 3) styles, and usually plumose stigmas; fruit a caryopsis, the grain rarely free from the pericarp. Herbaceous or sometimes woody plants with round or somewhat flattened, hollow or solid stems (culms), and 2-ranked, usually parallel-veined leaves consisting of a sheath which envelops the culm, a blade, usually flat, and between the two on the inside a membranaceous or hairy appendage (ligule), this rarely obsolete.

## KEY TO THE GENERA

- a. Plants with woody culms, erect or often clambering. Blades petioled. (BAMBUSEAE.) (See also *Lasiacis*.)
- b. Culms in large erect clumps, usually 10 m. or more high; stamens 6; spikelets several-flowered.
- c. Culms thornless; keels of palea wingless ..... 1. BAMBUSA
- cc. Culms thorny; keels of palea winged ..... 2. GUADUA
- bb. Culms clambering, or if erect, much less than 10 m. high. Sterile lemmas 1 or 2 below the fertile florets.
- c. Spikelets with 2 or more perfect florets ..... 3. ARTHROSTYLIDIUM
- cc. Spikelets with 1 perfect floret ..... 4. CHUSQUEA
- aa. Plants herbaceous (woody in *Lasiacis* with subglobose spikelets).
- b. Spikelets 1- to many-flowered, the reduced florets, if any, above the fertile florets (lower florets empty in *Uniola* and *Ctenium*); articulation usually above the glumes (below the glumes in *Zeugites*, *Cinna*, *Polypogon*, *Oryza*, and *Leersia*).
- c. Spikelets in groups of 2-5, the groups racemose along a common axis, falling entire.
- d. Groups of spikelets nodding; first glumes relatively thin, not forming an involucre ..... 36. AEGOPOGON
- dd. Groups of spikelets erect, the first glumes broad, indurate, forming a pitcher-shaped involucre around the spikelets ..... 27. ANTHEPHORA
- cc. Spikelets solitary or paired, not arranged in groups along a common axis.
- d. Lemma with a long much-contorted awn, the awns becoming tangled and remaining attached at the apex of the axis. Broad-leaved perennials ..... 5. STREPTOCHAETA
- dd. Lemma awnless, or, if awned, the awn straight or geniculate, never contorted or becoming tangled.
- e. Spikelets unisexual. Plants monoecious.
- f. Spikelets arranged in whorls in a dense spike, each whorl consisting of a sessile pistillate spikelet surrounded by 4 or 5 staminate pedicellate spikelets; stamens numerous ..... 69. PARIANA
- ff. Spikelets paniculate.
- g. Spikelets in somewhat distant pairs along the main branches, one of each pair sessile, pistillate, the other long-pedicellate, staminate, much smaller than the pistillate spikelet; stamens 6 ..... 39. PHARUS
- gg. Spikelets not in pairs as above; stamens 2 or 3.
- h. Glumes wanting, only the lemma and palea present; aquatic grasses with the staminate and pistillate spikelets in separate inflorescences ..... 40. LUZIOLA
- hh. Glumes present; terrestrial, usually forest grasses. (OLYREAE).
- i. Panicles large, terminal, the pistillate spikelets on the upper branches and toward the ends of the lower



- ones, the staminate on the lower part of the lower branches ..... 58. OLYRA
- ii. Panicles small, axillary, or terminal and axillary, the terminal when present usually wholly staminate.
- j. Fruit roughly triangular, inflated, gibbous; panicles axillary, composed of 1 terminal pistillate spikelet, and a few staminate spikelets below it... 65. LITHACHNE
- jj. Fruit subcylindric; panicles terminal and axillary.
- k. Fruit sessile; terminal panicle, if present, wholly staminate, the axillary usually pistillate, or rarely with a few staminate or sterile spikelets on the lower branches ..... 66. RADDIA
- kk. Fruit raised on the enlarged and thickened segment of the rachilla ..... 67. CRYPTOCHLOA
- ee. Spikelets perfect, or if unisexual, the plants dioecious.
- f. Spikelets sessile or short-pedicellate on one side of a continuous rachis. (CHLORIDEAE).
- g. Spikelets 1-flowered with no rudimentary florets above the fertile one. Rachilla prolonged beyond the floret as a naked stipe ..... 31. CYNODON
- gg. Spikelets 2- to several-flowered, or, if only 1-flowered, with one or more rudimentary florets above the perfect one.
- h. Spikes digitate.
- i. Lemma awnless or awn-pointed.
- j. Rachis prolonged beyond the spikelets in a naked point..... 30. DACTYLOCTENIUM
- jj. Rachis not prolonged ..... 29. ELEUSINE
- ii. Lemma awned. Rudiment narrow or club-shaped, composed of one or more reduced sterile lemmas.... 34. CHLORIS
- hh. Spikes solitary or racemose.
- i. Spikes solitary, rarely two or three. Spikelets with two sterile florets below the fertile one. Second glume with a stout divergent awn at the middle .... 32. CTENIUM
- ii. Spikes several to many, racemose.
- j. Lemma entire or minutely bifid, awnless or 1-awned.
- k. Rudimentary floret 1-awned, sometimes reduced to one or two bristles, rarely wanting... 33. GYMNOPOGON
- kk. Rudimentary floret awnless ..... 28. LEPTOCHLOA
- jj. Lemma variously lobed or dentate, usually 3-awned ..... 35. BOUTELOUA
- ff. Spikelets pedicellate in open or contracted panicles (sessile in loose spikes in *Jouvea*).
- g. Spikelets 2- to several-flowered.
- h. Lemmas awnless or awned from the tip, sometimes from between the teeth of a minutely bifid apex. (FESTUCEAE).
- i. Lemma or rachilla villous with long silky hairs (staminate spikelets glabrous in *Gynerium*). Tall stout reeds.
- j. Plants dioecious. Culms very high with short internodes ..... 14. GYNERIUM
- jj. Plants with perfect flowers.
- k. Lemma and rachilla hairy; blades crowded at the base of the culms ..... 13. CORTADERIA
- kk. Lemma naked, rachilla hairy; blades distributed along the culms ..... 12. PHRAGMITES
- ii. Lemma and rachilla glabrous or pubescent but not with long silky hairs.
- j. Plants dioecious. Staminate spikelets many-flowered, rather distant in a loose spike, the pistillate solitary or clustered, nearly hidden in the leaves... 18. JOUVEA
- jj. Plants with perfect flowers.



- k. Blades ovate to lanceolate with conspicuous transverse veins, most of them distinctly pedicellate.
- l. Glumes narrow, acute, without transverse veins. Panicles usually large, the spikelets borne only at the ends of the fragile filiform branchlets ..... 16. ORTHOCLADA
- ll. Glumes broad with prominent transverse veins, the summit irregularly toothed..... 17. ZEUGITES
- kk. Blades linear with no transverse veins.
- l. Stigmas elongate, tendril-like. Spikelets distant in a long narrow 1-sided raceme..... 15. STREPTOGYNE
- ll. Stigmas not elongate.
- m. Lemma 3-nerved, the palea usually persistent ..... 10. ERAGROSTIS
- mm. Lemma 5- to several-nerved, the nerves sometimes obscure.
- n. Spikelets with 1-4 empty lemmas below the fertile florets, large and very flat..... 11. UNIOLA
- nn. Spikelets with no empty lemmas below the fertile florets.
- o. Lemmas densely pubescent on the nerves, awnless, keeled..... 9. POA
- oo. Lemmas glabrous, or pubescent all over.
- p. Spikelets short-pedicellate, rather distant in a simple raceme..... 7. BRACHYPODIUM
- pp. Spikelets in open or contracted panicles.
- q. Lemma awned from between the teeth of the minutely bifid apex, conspicuously compressed..... 6. BROMUS
- qq. Lemma awnless or awned from the tip, rounded or obscurely keeled..... 8. FESTUCA
- hh. Lemma awned from the back. Glumes as long as the lowest floret, usually about as long as the spikelet. (AVENEAE.)..... 19. TRisetum
- gg. Spikelets 1-flowered.
- h. Spikelets strongly laterally compressed; glumes minute or wanting; articulation below the spikelet. (ORYZAE).
- i. Glumes minute; lemmas often awned..... 37. ORYZA
- ii. Glumes wanting; lemmas awnless..... 38. LEERSIA
- hh. Spikelets terete, or at least not strongly compressed; glumes usually well developed; articulation above the glumes (below the glumes in *Cinna* and *Polygogon*). (AGROSTIDEAE).
- i. Glumes awned ..... 22. POLYPOGON
- ii. Glumes awnless, or, if awned, much shorter than the floret.
- j. Lemma with a very short awn from just below the apex ..... 21. CINNA
- jj. Lemma awnless or with a well-developed awn.
- k. Fertile spikelets surrounded by numerous sterile spikelets in the form of bristles or delicate bracts ..... 23. PEREILEMA
- kk. Spikelets all perfect, not surrounded by bristles.
- l. Palea wanting; lemma awnless or awned from the back ..... 20. AGROSTIS
- ll. Palea well developed; lemma awnless or awned from the tip.



- m. Awn simple; lemma firm but not indurate; callus blunt, glabrous (sometimes pubescent or villous in *Muhlenbergia*).
- n. Lemma 3-5-nerved, mucronate or awned 24. MUHLENBERGIA
- nn. Lemma 1-nerved, obtuse or subacute 25. SPOROBOLUS
- mm. Awn trifid, the lateral ones sometimes reduced or wanting; lemma indurate; callus sharp, bearded ..... 26. ARISTIDA
- bb. Spikelets with 1 perfect terminal floret and a sterile or staminate floret below it (both florets usually fertile in *Isachne*); articulation below the glumes (except in *Arundinella*), either in the pedicel, the rachis, or at the base of a cluster of spikelets.
- c. Glumes membranaceous; fertile lemma indurate or at least as firm as the glumes; sterile lemma like the glumes in texture.
- d. Fertile lemma scarcely firmer than the glumes, awned, the awns relatively long, geniculate ..... 41. ARUNDINELLA
- dd. Fertile lemma usually much firmer than the glumes, awnless or awn-tipped. (PANICEAE).
- e. Spikelets subtended by bristles or enclosed in spiny burs.
- f. Spikelets subtended by bristles.
- g. Bristles persistent ..... 62. SETARIA
- gg. Bristles deciduous, falling with the spikelet ..... 63. PENNISETUM
- ff. Spikelets enclosed in spiny burs ..... 64. CENCHRUS
- ee. Spikelets neither subtended by bristles nor enclosed in spiny burs.
- f. Spikelets arranged on one side of spike-like racemes.
- g. Margins of fertile lemma thin, not inrolled.
- h. Spikelets densely covered with long tawny silky hairs 43. TRICHACHNE
- hh. Spikelets glabrous or pubescent but not long-silky ..... 44. DIGITARIA
- gg. Margins of fertile lemma inrolled, indurate.
- h. Rachilla joint and first glume adnate, forming a swollen ring-like callus ..... 49. ERIOCHLOA
- hh. Rachilla joint and first glume neither adnate nor swollen.
- i. Racemes solitary (see also *Paspalum*).
- j. Spikelets sunken in a thick corky rachis; rachis disarticulating at maturity ..... 45. STENOTAPHRUM
- jj. Spikelets not sunken in a thick corky rachis; rachis not disarticulating at maturity.
- k. Rachis rather broadly winged, partially enfolding the spikelets; spikelets paired but rather distant, appearing as if solitary in a single row, the spikelets of each pair placed back to back ..... 46. THRASYA
- kk. Rachis wingless; spikelets solitary, the back of the fertile lemma turned from the rachis ..... 48. MESOSETUM
- ii. Racemes 2 to many (sometimes solitary in *Paspalum*).
- j. Spikelets awned or awn-pointed.
- k. First glume long-awned, the body nearly as long as the spikelet; spikelets glabrous or pubescent but not hispid ..... 60. OPLISMENUS
- kk. First glume awnless, less than half as long as the spikelet; spikelets hispid ..... 61. ECHINOCHLOA
- jj. Spikelets awnless.
- k. Fertile lemma with small wings at the base, these sometimes reduced to scars ..... 54. ICHNANTHUS
- kk. Fertile lemma wingless.
- l. First and second glume equal, nearly as long as the spikelet, the second becoming spiny at maturity. Racemes loosely flowered ..... 47. PSEUDECHINOLAENA
- ll. First glume not more than half as long as the spikelet, or wanting, the second as long as the spikelet, glabrous or pubescent but not spiny.
- m. Back of the fruit turned away from the rachis.



- n. First glume well developed..... 50. BRACHIARIA  
 nn. First glume wanting..... 51. AXONOPUS  
 mm. Back of the fruit turned toward the rachis.  
 n. First glume always present..... 53. PANICUM  
 nn. First glume usually wanting (often present in *P. langei* and occasionally in other species) ..... 52. PASPALUM  
 ff. Spikelets paniculate (panicles dense and spike-like in *Sacciolepis* and *Hymenachne amplexicaulis*).  
 g. Spikelets villous with appressed or spreading hairs; first glume wanting ..... 42. LEPTOCORYPHIUM  
 gg. Spikelets glabrous or pubescent; first glume always present.  
 h. Fertile lemma with small wings at the base, these sometimes reduced to scars ..... 54. ICHNANTHUS  
 hh. Fertile lemma wingless.  
 i. Spikelets with 2 fertile florets ..... 59. ISACHNE  
 ii. Spikelets with only 1 fertile floret.  
 j. Second glume inflated, saccate at the base; spikelets unsymmetrical ..... 56. SACCIOLEPIS  
 jj. Second glume not inflated; spikelets symmetrical.  
 k. First and second glume equal, similar, as long as the spikelet. Plants widely decumbent-spreading ..... 58. HOMOLEPIS  
 kk. First glume rarely more than half as long as the second, dissimilar.  
 l. Panicles dense, spike-like or with narrowly ascending branches; fruit scarcely indurate, open at summit ..... 57. HYMENACHNE  
 ll. Panicles mostly open, loosely flowered, fruit indurate, closed at summit, the lemma tightly enclosing the palea.  
 m. Spikelets with a tuft of woolly hairs at the tip of the second glume and sterile lemma; plants woody, clambering..... 55. LASIACIS  
 mm. Spikelets without woolly hairs; plants herbaceous..... 53. PANICUM  
 cc. Glumes indurate; fertile lemma hyaline or membranaceous, the sterile lemma like the fertile one in texture; spikelets arranged in pairs in narrow spikes or racemes.  
 d. Spikelets with perfect flowers, each perfect spikelet usually paired with a staminate or reduced sterile spikelet, or sometimes all the spikelets perfect and alike. (*ANDROPOGONEAE*).  
 e. Racemes paniculate. (See also *Andropogon saccharoides*).  
 f. Panicles conspicuously silky; spikelets awnless.  
 g. Panicles white or pinkish, loose but rather dense.  
 h. Rachis continuous; spikelets unequally pedicellate ..... 70. IMPERATA  
 hh. Rachis breaking up at maturity; lower spikelet sessile, the upper pedicellate ..... 71. SACCHARUM  
 gg. Panicles golden brown, very dense and compact ..... 72. ERIOCHRYSIS  
 ff. Panicles not silky; spikelets awned. Racemes reduced to one or few joints.  
 g. Pedicellate spikelet staminate ..... 78. SORGHUM  
 gg. Pedicellate spikelet wanting, the pedicel only present..... 79. SORGHASTRUM  
 ee. Racemes solitary, paired, or digitate, sometimes aggregate in a large compound inflorescence, if paniculate, the racemes crowded in a dense, silky, terminal panicle.  
 f. Spikelets all perfect, alike.  
 g. Racemes solitary at the ends of the branches; spikelets awned ..... 73. POLYTRIAS  
 gg. Racemes digitate; spikelets awnless ..... 82. ISCHAEMUM  
 ff. Spikelets of each pair unlike, the lower sessile, perfect, the upper pedicellate, usually reduced (conspicuous in *Hackelochloa* and *Diectomis*).  
 g. Spikelets awnless.



- h. Plants annual; rachis joint and the pedicel of the upper spikelet grown together. First glume of sessile spikelet globose, alveolate ..... 83. HACKELOCHLOA
- hh. Plants perennial; rachis joint and pedicel distinct.
  - i. Rachis joints and pedicels much thickened at the summit, glabrous; pedicellate spikelet rudimentary... 84. MANISURIS
  - ii. Rachis joints and pedicels not much thickened at the summit; pedicellate spikelet staminate or neuter..... 81. ELYONURUS
- gg. Spikelets, at least the fertile ones, awned.
  - h. Culms simple, usually with a single terminal erect raceme; awns plumose, 3-5 cm. long..... 80. TRACHYPOGON
  - hh. Culms branching, at least toward the summit; awns glabrous or scabrous.
    - i. Pedicellate spikelet conspicuous, the first glume broad, awned, obscuring the spikelets; awn of fertile lemma 4-5 cm. long, geniculate; plants annual..... 75. DIECTOMIS
    - ii. Pedicellate spikelet inconspicuous; awn of fertile lemma usually less than 15 mm. long; plants perennial.
      - j. First glume sharply 2-keeled, at least toward the summit.
        - k. Spikelets of all pairs unlike, the sessile fertile, the pedicellate sterile ..... 74. ANDROPOGON
        - kk. Spikelets of the lower pairs alike, staminate or neuter ..... 76. CYMBOPOGON
      - jj. First glume of sessile spikelet rounded on the back, the margins involute ..... 77. HYPARRHENIA
- dd. Spikelets unisexual, the staminate and pistillate spikelets in separate inflorescences or the staminate above and the pistillate below in the same spike.
  - e. Staminate spikelets in a terminal tassel, the pistillate in the axils of the leaves ..... 87. ZEA
  - ee. Staminate spikelets above, the pistillate below in the same spike.
    - f. Spikes short, the 1- or 2-flowered pistillate portion enclosed in a bead-like sheathing bract ..... 86. COIX
    - ff. Spikes elongate, many-flowered, the pistillate portion breaking up into joints, not enclosed in a sheathing bract..... 85. TRIPSACUM

### 1. BAMBUSA Retz.

BAMBUSA Retz. Obs. Bot. 5:24. 1789.

Spikelets several-flowered, terminating short, much reduced branches of small condensed inflorescences, these approximate on the relatively slender branches of the flowering culms subtended by bract-like sheaths which are readily deciduous; inflorescence at first appearing like a single spikelet, but gradually developing short branches from the axils of the glume-like bracts, thus continuing until the inflorescence is a dense cluster of spikelets; glumes wanting; lemmas firm, obscurely several-nerved, acute or awn-tipped; keels of palea wingless; stamens 6. Tall erect bamboos growing in large clumps.

1. BAMBUSA VULGARIS Schrad. ex Wendl. Coll. Pl. 2:26. *pl.* 47. 1808.

Culms 6-10 m. high, erect, as much as 10 cm. in diameter, at first green but finally turning yellow; sheaths (of the branches) crowded, keeled, auriculate; blades lanceolate-acuminate, rounded at the base, mostly 15-30 cm. long, 1.5-4 cm. wide, the petioles rather broad, 3-5 mm. long; spikelets 1.5 cm. long, about 6-flowered; lemmas 8-10 mm. long, acute or awn-pointed.



Commonly cultivated. Introduced from the Old World.

CANAL ZONE: Balboa, *Standley 26987*.

## 2. GUADUA Kunth

GUADUA Kunth, *Syn. Pl. Aequin.* 1:252. 1822.

Spikelets cylindrical, several-flowered, elongate, in small groups toward the ends of short, somewhat leafy flowering branches, the arrangement similar to that of *Bambusa* but the clusters of spikelets never becoming so dense; lemmas imbricate, ovate, broad and clasping at the base; keels of palea broadly winged; stamens 6.

Tall, erect bamboos, which are usually spiny, especially at the nodes of the branches.

1. GUADUA ACULEATA Rupr. ex Fourn. *Compt. Rend. Acad. Sci. (Paris)* 84:198. 1877.

Similar in aspect to *Bambusa vulgaris* but very spiny; spikelets as much as 6 cm. long at maturity, few- to 10-flowered; lemmas about 12 mm. long, sub-obtuse, apiculate, more or less pubescent on the margins.

Common in low swampy ground and jungles at low altitudes, Mexico to Brazil.

CHIRIQUÍ: Boquerón, *Allen 300*. CANAL ZONE: Culebra, *Hitchcock 7950* (sterile).

## 3. ARTHROSTYLIDIUM Rupr.

ARTHROSTYLIDIUM Rupr. *Mém. Acad. St. Pétersb. VI. Sci. Nat.* 3<sup>1</sup>:117. 1839.

Spikelets few-flowered with one or two sterile lemmas below the fertile florets, arranged in simple racemes; stamens 3. Clambering or sometimes erect slender shrubs, with numerous, short, densely fasciculate branches.

1. ARTHROSTYLIDIUM RACEMIFLORUM Steud. *Syn. Pl. Glum.* 1:336. 1854.

Culms slender, as much as 5 m. long, clambering or rarely erect, the slender fascicled branches 10–50 cm. long, the fertile usually shorter than the sterile ones; sheaths minutely pubescent; blades lanceolate, mostly 5–10 cm. long, 4–12 mm. wide, densely pubescent on the lower surface at the base, otherwise glabrous or minutely pubescent; racemes 2–8 cm. long, the axis pubescent; spikelets somewhat crowded, appressed; lemmas 6–8 mm. long with an awn 1–2 mm. long, glabrous or minutely pubescent; palea slightly longer than the lemma, strongly ciliate on the keels especially toward the summit.

Moist thickets and forests at lower altitudes, southeastern Mexico to Colombia.

CANAL ZONE: Summit, *Standley 25785*; Barro Colorado Island, *Kenoyer 126*; *Standley 31344*. PANAMÁ: Chorrera, *Hitchcock 8150*; Río Tapía, *Hitchcock 22552½*; Río Tecúmen, *Standley 26572*.

This bamboo apparently flowers very infrequently. All the above specimens are sterile.



## 4. CHUSQUEA Kunth

CHUSQUEA Kunth, Syn. Pl. Aequin. 1:254. 1822.

Spikelets terete; glumes small or nearly wanting, nerveless; sterile lemmas 2, often as long as the solitary fertile floret; stamens 3. Clambering or erect shrubs with contracted panicles fascicled on the main culm or on long slender branches.

- |  |                     |
|--|---------------------|
| a. Blades of fertile branches much reduced, 0.5–2 cm. long; panicles composed of 1–4 spikelets .....   | 1. C. SIMPLICIFLORA |
| aa. Blades of fertile branches scarcely reduced, more than 6 cm. long; panicles many-flowered.         |                     |
| b. Blades linear or narrowly lanceolate, not tessellate; spikelets 12–15 mm. long .....                | 2. C. LONGIFOLIA    |
| bb. Blades lanceolate, rounded at the base, conspicuously tessellate; spikelets about 5 mm. long ..... | 3. C. SUBTESSELLATA |

1. CHUSQUEA SIMPLICIFLORA Munro, Trans. Linn. Soc. Bot. 26:54. 1868.

Culms scandent or high-climbing, as much as 25 m. long, 5 mm. thick, smooth or roughly papillose above the nodes; sheaths ciliate, more or less fimbriate at the mouth; blades of the sterile shoots mostly 5–9 cm. long, 8–15 mm. wide, pilose on the lower surface at the base, otherwise glabrous, the margins scabrous; fertile shoots 2–8 cm. long in dense fascicles on long slender drooping branches, the blades 5–20 mm. long; panicles very small, composed of 1 to 4 spikelets; spikelets 8–9 mm. long, appressed; glumes thin, about 0.5 mm. long; sterile lemmas acuminate, half to two-thirds as long as the floret; fertile lemma acute, awnless, glabrous; palea about as long as the lemma, rounded on the back or sulcate only near the tip; stamens 3.5 mm. long.

Common in moist thickets and forests at low altitudes, Guatemala, Costa Rica, and Panama.

COLÓN: Catival, *Standley* 30257. CANAL ZONE: Frijoles, *Piper* 5291; *Standley* 27433; Empire, *Hitchcock* 7952; *Piper* 5292; Gamboa, *Standley* 28367; Obispo, *Standley* 31669; Cerro Gorda, *Standley* 25985; Barro Colorado Island, *Bailey & Bailey* 285; *Kenoyer* 125; Corozal, *Standley* 27339, 29062; Pedro Miguel, *Hitchcock* 7959; "Lion Hill Station," *Hayes* 661 (TYPE); Brazos Brook Reservoir, *Stevens* 698. PANAMÁ: Río Tapía, *Hitchcock* 22952; *Standley* 26123, 28038.

The above specimens are nearly all sterile.

2. CHUSQUEA LONGIFOLIA Swallen, Jour. Washington Acad. Sci. 30:210. 1940.

Main culm about 5 mm. thick (in the flowering portion), the flowering branches fascicled, ascending, 20–60 cm. long; blades 12–25 cm. long, 6–12 mm. wide, glabrous, the margins scabrous; panicles 10–16 cm. long, narrow, the slender branches appressed, scabrous; spikelets 12–13 mm. long, appressed; glumes obtuse, nerveless, the first 0.5 mm. long, the second 1 mm. long; first sterile lemma 7–9 mm. long, 9-nerved, acute, mucronate, very broad at the base; second sterile lemma about as long as the spikelet, 9-nerved, acuminate, scabrous toward the tip; fertile lemma 11–12 mm. long, obscurely nerved, acuminate, puberulent, minutely bifid, mucronate or with an awn 2–4 mm. long; palea as long as or a little longer than the lemma, bidentate, broad and rounded toward the base, keeled near the summit, the keels approximate, the margins very broad, incurved.



Forests, 1300 to 2450 meters, Mexico (Chiapas), Costa Rica and Panama.

CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock 8200; Pittier 3085*.

3. *CHUSQUEA SUBTESSELLATA* Hitchc. Proc. Biol. Soc. Washington 40:81. 1927.

Culms erect, 1–3 m. high; sheaths pubescent, becoming glabrous; blades appressed, 5–10 cm. long, 8–15 mm. wide, acuminate or subattenuate, firm, tessellate-veined, the margins indurate, scabrous; panicles 7–15 mm. long, dark purple, narrow, condensed or somewhat loose, the rachis and appressed branches densely appressed-pubescent; spikelets 5–6 mm. long; glumes obtuse, the first 1 mm. long, the second 2 mm. long; sterile lemmas acute or apiculate, 5-nerved, more or less scabrous on the nerves, two-thirds to three-fourths as long as the spikelet; fertile lemma acute or apiculate, scabrous near the tip; palea a little shorter than the lemma, rounded on the back, but keeled and somewhat sulcate at the tip.

Forming dense thickets on paramos, alt. 2700 to 3000 meters, Costa Rica (Cerro de la Muerta and Cerro de las Vueltas) and Panama.

CHIRIQUÍ: Volcán de Chiriquí, *Pittier 3069*.

5. *STREPTOCHAETA* Schrad.

*STREPTOCHAETA* Schrad. ex Nees, *Agrost. Bras.* 536. 1829.

Spikelets 1-flowered, terete, disarticulating below the glumes; empty bractlets (probably glumes and sterile lemmas) 4, much shorter than the spikelet, more or less toothed; lemma indurate, gradually narrowed into a long much contorted awn; palea shorter than the lemma, bifid to the base, indurate like the lemma; inner bracts (lodicules) 3, imbricate, longer than the palea, firm but less indurate than the lemma and palea; stamens 6, monadelphous, the tube about as long as the lemma; style 1, stigmas 3. Broad-leaved perennials with the spikelets in usually elongate spikes.

- |  |                        |
|--|------------------------|
| a. Blades 6–9 cm. wide; spikelets, excluding awns, about 14 mm. long;<br>spike dense, usually many-flowered.....           | I. <i>S. SODIROANA</i> |
| aa. Blades 3–4.5 cm. wide; spikelets, excluding awns, about 22 cm. long;<br>spike few-flowered, the spikelets distant..... | 2. <i>S. SPICATA</i>   |

1. *STREPTOCHAETA SODIROANA* Hack. *Oesterr. Bot. Zeitschr.* 40:113. 1890.

Perennial; culms erect or rarely decumbent at the base and rooting at the lower nodes, 60–100 cm. high, densely pubescent below the inflorescence; lower sheaths much shorter than the internodes, the upper ones crowded, flattened but scarcely keeled, glabrous, broadened at the truncate, more or less auriculate, densely ciliate mouth; ligule obsolete; blades 18–30 cm. long, 6–9.5 cm. wide, petiolate, asymmetrical, rather abruptly acute or acuminate, glabrous; spike 20–30 cm. long, about 1 cm. thick, densely many-flowered; the axis and the pedicels of the spikelets conspicuously hispid; spikelets appressed, somewhat obscured by the awns; lower bracts very short, obscure, irregularly lobed; lemma about 12 mm. long, tapering into an awn 10 cm. long, the lower part (about 6 cm.) nearly straight, the upper part much finer, minutely but conspicuously contorted; palea 8–9 mm.



long, the lobes acute, somewhat spreading at the tip; lodicules unequal, 13–15 mm. long, somewhat exceeding the lemma.

Moist or wet forests at low altitudes, often common, British Honduras to Panama; Ecuador.

CHIRIQUÍ: Cerro de la Plata, *Pittier 5164*. CANAL ZONE: Nueva Limón, *Maxon 6896*; Barro Colorado Island, *Standley 31374, 41084*; *Kenoyer 103*; *Maxon, Harvey & Valentine 6824*; Juan Mina, *Bartlett & Lasser 16790*.

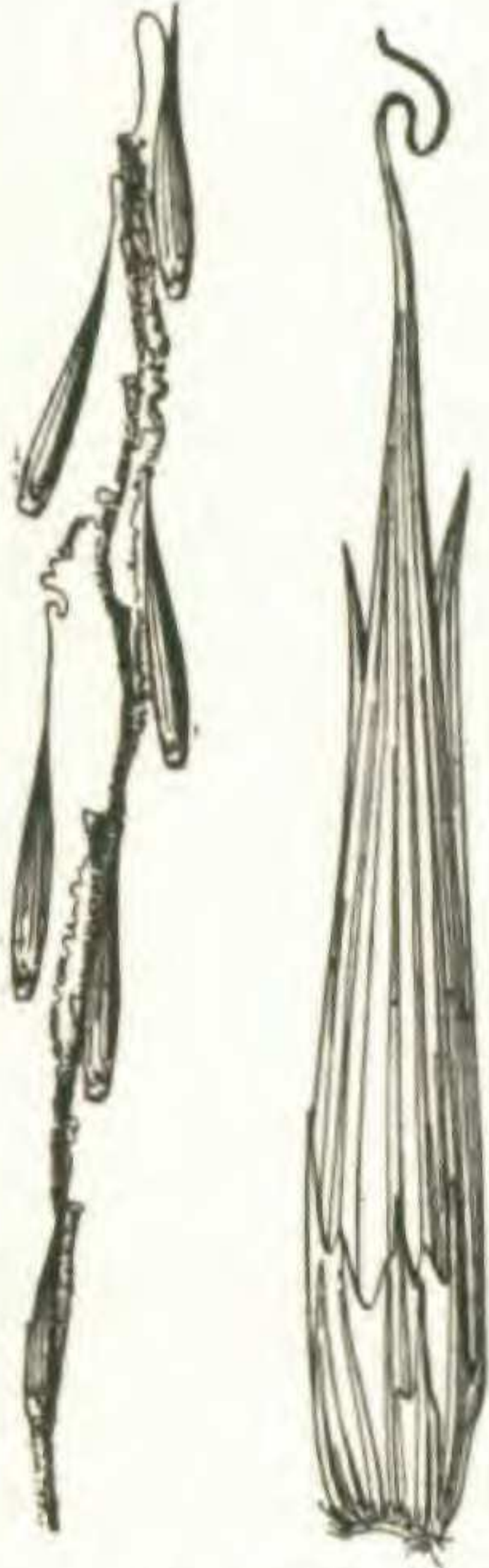


Fig. 6.  
*Streptochaeta spicata*

2. STREPTOCHAETA SPICATA Schrad. ex Nees, *Agrost. Bras.* 537. 1829.

Perennial; culms 60–90 cm. high, simple or sparingly branched, pubescent at and below the nodes; lower sheaths shorter than the internodes, the upper somewhat crowded, pilose on the margins toward the base, hispid-ciliate at the mouth, often auriculate, the auricles as much as 7 mm. long; blades 8–15 cm. long, 2.5–4.5 cm. wide, acute, nearly symmetrical, glabrous; spike 10–12 cm. long, bearing 5–9 erect spikelets, the axis densely pubescent; spikelets 20–24 mm. long; lower bracts 2–3 mm. long, the first two narrow, awned, the other two very broad, awnless, strongly nerved, irregularly dentate; lemmas as long as or a little shorter than the lodicules, tapering into an awn 7–10 cm. long, becoming slender and finally contorted in the upper third; divisions of the palea acuminate, 14–15 mm. long.

Wet forests, Guatemala and Trinidad to Ecuador and Brazil.

CHIRIQUÍ: San Felix (Cerro de la Plata), *Pittier 5164½*. CANAL ZONE: Frijoles, *Standley 27489*. PANAMÁ: between Pinogana and Yavisa, *Allen 245*.

6. BROMUS L.

BROMUS L. *Sp. Pl.* 76. 1753.

*Ceratocloa* Beauv. *Ess. Agrost.* 75, *pl.* 15, *f.* 7. 1812.

Spikelets several-flowered, the rachilla disarticulating above the glumes and between the florets; glumes acute, the first 1- or obscurely 3-nerved, the second 3- to 5-nerved; lemmas keeled, 5- to 9-nerved, awned from between the teeth of the minutely bifid apex; palea shorter than the lemma, thin, ciliate on the keels, adherent to the caryopsis.

Slender perennials with closed sheaths, flat narrow blades, and open panicles of relatively large spikelets.

1. BROMUS EXALTATUS Bernh. *Linnaea* 15: *Litt.* 90. 1841.

*Bromus subalpinus* Rupr. ex Fourn. *Mex. Pl.* 2:128. 1886.

Perennial; culms erect from a more or less decumbent base, 0.5 to more than 1 m. high, retrorsely pilose at the nodes; sheaths longer than the internodes or the



upper ones shorter, appressed- or spreading-pilose especially toward the summit; ligule membranaceous, erose, about 1 mm. long; blades flat, mostly 15–30 cm. long, 3–5 mm. wide, rarely wider, scabrous, more or less pilose toward the base; panicles 10–20 cm. long, nodding, the slender drooping branches naked below, bearing 1–3 spikelets; glumes narrow, acuminate, subequal or the second longer, the first 1- or obscurely 3-nerved, 8–12 mm. long; lemmas mostly 12–15 mm. long, acuminate, rather evenly hairy across the back, the awn 4–7 mm. or sometimes as much as 1 cm. long.

Savannas at higher altitudes, Mexico, Guatemala, and Panama.

CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock 8214; Woodson & Schery 408.*

### 7. BRACHYPODIUM Beauv.

BRACHYPODIUM Beauv. Ess. Agrost. 100, 155. 1812.

Spikelets several-flowered, subterete except in anthesis, short-pedicelled, usually appressed, rather distant in simple racemes; glumes strongly nerved, the second broader and a little longer than the first; lemmas rounded on the back, obscurely nerved, awned from the tip; palea about as long as the lemma, strongly ciliate on the keels; caryopsis adnate to the palea.

1. BRACHYPODIUM MEXICANUM (Roem. & Schult.) Link, Hort. Berol. 1:41. 1827.

*Festuca mexicana* Roem. & Schult. Syst. Veg. 2:732. 1817.

Perennial; culms slender, wiry, branching, usually geniculate-spreading, 15–90 cm. long, sparsely pilose, densely bearded at the nodes; sheaths much shorter than the internodes, pilose; ligule 2–3 mm. long, erose-ciliate; blades 5–12 cm. or sometimes as much as 20 cm. long, 2–5 mm. wide, scabrous, sparsely to rather densely pilose on the upper surface; racemes 4–12 cm. long, sometimes reduced to one or two spikelets; spikelets 2–2.5 cm. long, 4- to 8-flowered, the pedicels 2–3 mm. long, densely pubescent; glumes subobtuse, the first 6–9 mm. long, the second 8–11 mm. long, glabrous; lemma of lowest floret 8–10 mm. long, scabrous at least toward the summit, the awn mostly 2–5 mm. long, or rarely as much as 1 cm. long.

Moist thickets and shady banks at higher altitudes, Mexico to Bolivia.

CHIRIQUÍ: Volcán de Chiriquí, *Woodson, Allen & Seibert 1058; Hitchcock 8210.*

### 8. FESTUCA L.

FESTUCA L. Sp. Pl. 73. 1753.

Densely tufted perennials with flat or loosely involute blades and narrow or open panicles. Spikelets few- to several-flowered, the rachilla disarticulating above the glumes and between the florets; glumes narrow, unequal, the first 1-nerved, the second 3-nerved; lemmas rounded on the back, awnless or awned from the tip; palea not adhering to the caryopsis.



- a. Blades flat, 4–10 mm. wide.  
 b. Lemmas awnless, 6–7 mm. long; blades relatively firm, 5–10 mm. wide ..... 1. *F. AMPLISSIMA*  
 bb. Lemmas awn-pointed or awned, 12–15 mm. long; blades relatively soft, 4–6 mm. wide..... 2. *F. CHIRIQUENSIS*  
 aa. Blades involute ..... 3. *F. DOLICHOPHYLLA*

1. *FESTUCA AMPLISSIMA* Rupr. Bull. Acad. Sci. Brux. 9<sup>2</sup>:236. 1842; Fourn. Mex. Pl. 2:125. 1886.

*Uniola muelleri* Fourn. Mex. Pl. 2:122. 1886.

Coarse perennial; culms erect, as much as 2 m. high, scabrous or nearly smooth; sheaths scabrous, shorter than the internodes, the lowermost becoming fibrous with age; blades 15–75 cm. long, 5–10 mm. wide, flat, firm, scabrous, acuminate or attenuate to a fine involute tip; ligule very short; panicles 20–30 cm. long, open, the branches slender, more or less flexuous, ascending or spreading, naked at the base, the lower ones usually about 15 cm. long, or sometimes as much as 25 cm. long; spikelets 8–15 mm. long, 4- to 7-flowered; glumes acute or acuminate, the first 4–6 mm. long, 1- to 3-nerved, the second 5–7 mm. long, 3-nerved; lemmas 7–8 mm. long, acute or acuminate, smooth or somewhat scabrous toward the tip, awnless or mucronate.

Savannas and open woods at rather high altitudes, Mexico to Panama.

CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock* 8208, 8226; *Davidson* 1043.

2. *FESTUCA chiriquensis* Swallen, sp. nov.

Perennis; culmi 80–100 cm. alti, erecti, caespitosi, glabri; vaginae internodiis multo longiores, glabrae, infimae fibrosae; ligula hyalina ca. 1 mm. longa; laminae 15–30 cm. longae, 4–6 mm. latae, tenues, laxae, lucidae, glabrae, marginibus scabris; paniculae 15–25 cm. longae, ramis gracilibus, pendulis, scabris, ad 12 cm. longis, in parte inferiore nudis; spiculae 15–18 mm. longae, 3–4-florae; glumae angustae, acuminatae, prima 8 mm. longa, 1-nervis, secunda 9–10 mm. longa, 1–3-nervis; lemmata scabra, nervosa, primum 14–15 mm. longum; aristae 1–3 mm. longae.

Perennial; culms cespitose, erect, 80–100 cm. high, glabrous; sheaths usually much longer than the internodes, loose, glabrous, the lowermost becoming fibrous with age; ligule about 1 mm. long, hyaline; blades 15–30 cm. long, 4–6 mm. wide, soft, lax, shining, glabrous, the margins scabrous; panicles 15–25 cm. long, nodding, the slender branches drooping, naked in the lower half, scabrous, as much as 12 cm. long; spikelets 15–18 mm. long, 3- to 4-flowered; glumes narrow, acuminate, the first about 8 mm. long, 1-nerved, the second 9–10 mm. long, 1- to 3-nerved; lemmas scabrous, distinctly nerved, the first 14–15 mm. long, the upper ones successively shorter, the awns 1–3 mm. long.

Savannas and open places in woods at medium to rather high altitudes, Panama.

CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock* 8225; open places in woods, 1300–1500 m. alt., Sept. 29–30, 1911, *Hitchcock* 8197 (TYPE).

3. *FESTUCA DOLICHOPHYLLA* Presl, Rel. Haenk. 1:258. 1830.

Perennial; culms densely cespitose, erect, 70–100 cm. high, smooth, shining;



sheaths glabrous, the lower ones crowded, the upper ones elongate but much shorter than the internodes; ligule very short, minutely ciliate; blades loosely involute, firm, erect, glabrous, 15–25 cm. long, the uppermost reduced; panicles 10–15 cm. long, the branches solitary or in pairs, rather distant, spreading, or erect at maturity, the lowermost as much as 10 cm. long; spikelets about 8 mm. long, 4- to 5-flowered; first glume narrow, 1-nerved, 4–6 mm. long, the second broader, obscurely 3-nerved, 6–8 mm. long; lemmas 5–7 mm. long, scabrous, awnless or awn-tipped.

Savannas at high altitudes, Panama to Chile.

CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock* 8220, 8227; *Killip* 4550.

### 9. POA L.

POA L. Sp. Pl. 67. 1753.

Spikelets 2- to several-flowered, the rachilla disarticulating above the glumes and between the florets, the uppermost floret reduced or rudimentary; glumes acute, the first 1-nerved, the second usually 3-nerved; lemmas acute or subobtuse, 5-nerved, usually pubescent on the nerves, sometimes webbed at the base, the tip and margins often scarious.

Annuals or perennials with flat or folded blades, boat-shaped at the tip, and open or contracted panicles.

1. POA ANNUA L. Sp. Pl. 68. 1753.

*Aira pumila* Pursh, Fl. Amer. Sept. 1:76. 1814.

*Poa infirma* H.B.K. Nov. Gen. & Sp. 1:158. 1816.

*Megastachya infirma* Roem. & Schult. Syst. Veg. 2:585. 1817.

*Catabrosa pumila* Roem. & Schult. Syst. Veg. 2:696. 1817.

*Poa aestivalis* Presl, Rel. Haenk. 1:272. 1830.

*Eragrostis infirma* Steud. Nom. Bot. ed. 2. 1:563. 1840.

*Poa annua* var. *rigidiuscula* L. H. Dewey, Contr. U. S. Nat. Herb. 3:262. 1895.

Soft, erect or decumbent-spreading annual; culms flattened, commonly 5–20 cm. high, glabrous; sheaths thin with hyaline margins, mostly longer than the internodes; ligule hyaline, about 5 mm. long; blades flat, mostly 5–10 cm. long, 1–3 mm. wide, the margins scabrous; panicle 3–10 cm. long, open with rather short ascending to spreading branches; spikelets short-pedicelled, crowded, 3- to 6-flowered; first glume 1.5–2 mm., the second 2–2.5 mm. long; lemmas about 3 mm. long, subobtuse, distinctly nerved, densely pubescent on the nerves, not webbed at the base.

Open ground and waste places, in cool or temperate regions. Introduced in America from Europe, occurring from Labrador to Alaska southward throughout the United States; also in tropical America at higher altitudes.

Annual blue-grass.

CHIRIQUÍ: New Switzerland, central valley of Río Chiriquí Viejo, *Allen* 1378.



## 10. ERAGROSTIS Host

ERAGROSTIS Host, Icon. Gram. Austr. 4:14. *pl.* 24. 1809.

*Neeragrostis* Bush, Trans. Acad. Sci. St. Louis 13:178. 1903.

Spikelets few- to many-flowered, the rachilla disarticulating above the glumes and between the florets, or continuous, the lemmas deciduous, the paleas persistent; glumes acute or acuminate, 1-nerved, or the second rarely 3-nerved, much shorter than the spikelet; lemmas acute or acuminate, keeled or rounded on the back, 3-nerved, the nerves prominent or sometimes obscure; palea 2-nerved, often ciliate on the keels.

Annuals or perennials with open or contracted panicles of small or rather large spikelets.

- a. Plants annual.
  - b. Palea prominently ciliate on the keels. Low delicate grasses.
    - c. Panicles open, loose, the branches spreading ..... 1. *E. AMABILIS*
    - cc. Panicles dense, spike-like, the branches closely appressed ..... 2. *E. CILIARIS*
  - bb. Palea not prominently ciliate on the keels.
    - c. Culms creeping, freely branching, forming dense soft mats ..... 3. *E. HYPNOIDES*
    - cc. Culms not creeping or forming mats, erect or geniculate at the lower nodes.
      - d. Spikelets grayish-green, pedicellate in open panicles, the lemmas subobtuse ..... 4. *E. TEPHROSANTHOS*
      - dd. Spikelets pale, tinged with red or reddish-brown, subsessile, fascicled on the branches.
        - e. Lemmas 2-2.5 mm. long, abruptly acute; spikelets mostly 6-10 mm. long ..... 5. *E. MAYPURENSIS*
        - ee. Lemmas 5 mm. long, gradually narrowed from the base; spikelets 10-30 mm. long ..... 6. *E. SIMPLICIFLORA*
- aa. Plants perennial.
  - b. Culms 15-60 cm. high, slender; spikelets 4-5 mm. long, 6-12-flowered ..... 7. *E. ACUTIFLORA*
  - bb. Culms 1-2 m. high, relatively stout; spikelets 5-10 mm. long, 10-16-flowered ..... 8. *E. DOMINGENSIS*

1. ERAGROSTIS AMABILIS (L.) Wight & Arn. ex Nees in Hook. & Arn. Bot. Beechey's Voy. 251. 1838.

*Poa amabilis* L. Sp. Pl. 68. 1753.

*Poa plumosa* Retz. Obs. Bot. 4:20. 1786.

*Eragrostis plumosa* Link, Hort. Berol. 1:192. 1827.



Fig. 7.  
*Eragrostis amabilis*

Annual; culms slender, erect or geniculate-spreading, 10-40 cm. high; blades flat, 4-10 cm. long, 2-4 mm. wide, acuminate, glabrous; sheaths glabrous, with a prominent tuft of hairs at the throat; panicles oblong, 3-12 cm. long, 1.5-3 cm. wide, the short branches stiffly ascending or spreading, 1-2.5 cm. long; spikelets mostly 1.5-2 mm. long, 4- to 6-flowered; lemmas 1 mm. long, obtuse, the palea conspicuously ciliate, the hairs about 0.3 mm. long.

A common weed in fields and waste places, in warmer regions of the world. Introduced in America.



CHIRIQUÍ: David, *Hitchcock* 8374. CANAL ZONE: Mt. Hope, *Standley* 28849; Darién, *Standley* 31512; Gamboa, *Standley* 28489; Summit, *Standley* 30083; Ancón, *Bro. Celestine* 21; *Killip* 4181; *Piper* 5232; Balboa, *Hitchcock* 8061; *Standley* 25621. COLÓN: Colón, *Rose* 22081, 23993.

2. ERAGROSTIS CILIARIS (L.) R. Br. in Tuckey, Narr. Exp. Congo App. 478. 1818.  
*Poa ciliaris* L. Syst. Nat. ed. 10. 2:875. 1759.

Annual; culms slender, branching, erect to decumbent-spreading, 10–40 cm. or rarely as much as 60 cm. high; sheaths glabrous or sparsely papillose-pilose, with a tuft of long hairs at the throat; blades flat, acuminate or attenuate, 4–10 cm. long, 2–4 mm., rarely 5 mm., wide, glabrous or sparsely pilose with long hairs; panicles dense, spike-like, interrupted toward the base, 5–12 cm. long; spikelets 2–3 mm. long, 6- to 10-flowered, nearly sessile; lemmas 1 mm. long; palea conspicuously ciliate on the keels, the hairs about 0.5 mm. long.

Fields and waste places, especially in sandy soil. Warmer regions of both hemispheres.

BOCAS DEL TORO: *Carleton* 220. CHIRIQUÍ: David, *Hitchcock* 8373. COLÓN: Colón, *Rose* 22068; *Hitchcock* 8032. CANAL ZONE: Toro Point, *Hitchcock* 8052; Gatuncillo, *Piper* 5289; Frijoles, *Killip* 4295; Darién, *Standley* 31577; Culebra, *Pittier* 2085; *Hitchcock* 7925; Balboa, *Standley* 26112; *McBride & Featherstone* 44. PANAMÁ: Bella Vista, *Killip* 4044; Point Chamé, *Hitchcock* 8161; Taboga Island, *Hitchcock* 8072.

3. ERAGROSTIS HYPNOIDES (Lam.) B.S.P. Prel. Cat. N. Y. 69. 1888.

*Poa hypnoides* Lam. Tabl. Encycl. 1:185. 1791.

*Megastachya hypnoides* Beauv. Ess. Agrost. 74, 167, 175. 1812.

*Poa reptans* var. *caespitosa* Torr. Fl. North. & Mid. U. S. 1:115. 1823.

*Neeragrostis hypnoides* Bush, Trans. Acad. Sci. St. Louis 13:180. 1903.

*Erosion hypnoides* Lunell, Amer. Midl. Nat. 4:221. 1915.

Stoloniferous, widely spreading annual, forming dense mats; culms very slender, 5–10 cm. high; blades 1–2 cm. long, flat or becoming loosely involute, stiffly spreading; panicles pale, dense, subcapitate, 1–2 cm. long, nearly as broad; spikelets 5–12 mm. long, few- to many-flowered, on short stiff pedicels; glumes unequal, the first 1 mm. long, the second 1.5 mm. long, broader than the first; lemmas 1.5–2 mm. long, acute, rather broad at the base with thin margins; anthers 0.2 mm. long.

Lake shores, stream banks, ditches, and wet places, United States and the West Indies to Argentina.

COCLÉ: El Valle de Antón, *Hunter & Allen* 378. COLÓN: Fató, *Pittier* 4146. CANAL ZONE: between France Field, Canal Zone, and Catival, Panama, *Standley* 30271; Juan Mina, *Bartlett & Lasser* 16360.

4. ERAGROSTIS TEPHROSANTHOS Schult. Mant. 2:316. 1824.

Annual; culms slender, erect or geniculate-spreading, 10–30 cm. high; blades lax, flat, acuminate, 4–15 cm. long, 2–4 mm. wide, glabrous; panicles lax, open, 5–12 cm. long, pilose in the axils, the branches spreading, naked at the base, often rather densely flowered; spikelets plumbeous, 4–6 mm. long, 1.5 mm. wide, 6- to



12-flowered, short-pedicellate, usually somewhat spreading, the first glume 1 mm. long, the second about 1.3 mm. long; lemmas 2 mm. long, subobtusate.

A common weed in fields and waste places, southern United States and the West Indies to Brazil.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart 91*; Bocas del Toro, *Carleton 29*; Changuinola Valley, *Dunlap 29a*. CHIRIQUÍ: El Boquete, *Hitchcock 8279*; *Killip 4506*; David, *Hitchcock 8379*. COLÓN: Colón, *Rose 23994*. CANAL ZONE: Gatuncillo, *Killip 4166*; Gatún, *Standley 27319*; Frijoles, *Killip 4297, 4299*; *Standley 27652, 31476*; *Pittier 6842*; Culebra, *Hitchcock 7927*; Summit, *Standley 30080*; Balboa, *Standley 30900*; Bro. Gervasius 1; *Porterfield 10*. PANAMÁ: Panamá, *Hitchcock*, in 1911.



Fig. 8. *Eragrostis hypnoides*

5. ERAGROSTIS MAYPURENSIS (H.B.K.) Steud. Syn. Pl. Glum. 1:276. 1854.

*Poa maypurensis* H.B.K. Nov. Gen. & Sp. 1:161. 1816.

*Poa vahlilii* Roem. & Schult. Syst. Veg. 2:563. 1817.

*Eragrostis vahlilii* Nees, Agrost. Bras. 499. 1829.

*Eragrostis amoena* Presl, Rel. Haenk. 1:275. 1830.

*Eragrostis panamensis* Presl, Rel. Haenk. 1:277. 1830.

*Megastachya amoena* Fourn. Mex. Pl. 2:118. 1886.

*Megastachya panamensis* Fourn. Mex. Pl. 2:118. 1886.



Annual; culms erect or decumbent at the base, 10–40 cm. or sometimes as much as 65 cm. high; sheaths glabrous, shorter than the internodes; blades flat, attenuate, mostly 6–15 cm. long, rarely longer, 2–4 mm. wide, papillose-pilose, especially on the upper surface, or nearly glabrous; panicles 8–15 cm. long, erect, the somewhat distant solitary branches stiffly ascending, spikelet bearing nearly to the base, densely pilose in the axils; spikelets 6–10 mm. long, 8- to 28-flowered, short-pedicellate, somewhat spreading, usually tinged with red or purple; glumes acuminate, as long as the lowest floret; lemmas 2–2.5 mm. long, broad at the base, rather abruptly narrowed above the middle to an acute or acuminate tip.

Wet or dry savannas, fields, moist thickets, and waste places, southern Mexico to Brazil and Bolivia.

CHIRIQUÍ: San Felix, *Pittier 5184*; David, *Hitchcock 8378*. COCLÉ: Aguadulce, *Pittier 4851, 4864*. CANAL ZONE: Mt. Hope, *Standley 28799*; Corozal, *Hitchcock 9191*; *Standley 29026*. PANAMÁ: Río Indio, *Dodge & Allen 17380*; Río Azote Caballo, *Dodge, Steyermark & Allen 16857*; Abalaba, *Killip 4270*; Río Tapía, *Hitchcock 22950*; *Standley 28165*; Bella Vista, *Standley 25366*; Punta Paitilla, *Standley 26267*; Río Tecúmen, *Standley 26645, 29395*; Matías Hernández, *Pittier 6889, 6919*; *Standley 31859*; Pacora, *Killip 4199*; Río Pacora, *Killip 4226*; Chepo, *Pittier 4768*; *Hunter & Allen 81*.

6. *ERAGROSTIS SIMPLICIFLORA* (Presl) Steud. Syn. Pl. Glum. 1:278. 1854.

*Megastachya simpliciflora* Presl, Rel. Haenk. 1:283. 1830.

Annual; culms tufted, often dense, spreading or prostrate, 10–40 cm. long, rather freely branching at the lower nodes; blades 4–12 cm. long, 2–4 mm. wide, acuminate, pilose on the upper surface; panicles 2–10 cm. long, rather dense, usually purple-tinged, the short stiff branches ascending to spreading, spikelet bearing to the base, often so numerous on the branches that the whole plant appears to be a dense inflorescence; spikelets sessile or nearly so, narrow, 1–3 cm. long, 10- to 30-flowered, solitary or in groups of 2–4, appressed; lemma 5 mm. long, acuminate, gradually narrowed from the base, the lateral nerves double; palea half as long as the lemma, narrow, lunate.

Savannas, at low and medium altitudes, Mexico to Panama.

COCLÉ: Aguadulce, *Pittier 4838, 4900*. PANAMÁ: Aguarubia, *Killip 4273*; Las Cruces Trail, *Cornman 2611*.

7. *ERAGROSTIS ACUTIFLORA* (H.B.K.) Nees, Agrost. Bras. 501. 1829.

*Poa acutiflora* H.B.K. Nov. Gen. & Sp. 1:161. 1816.

Perennial; culms tufted, erect, 15–60 cm. high; sheaths glabrous, more or less hairy in the throat, mostly shorter than the internodes; blades rather firm, mostly 5–20 cm. long, 2–4 mm. wide, glabrous or sparsely pilose; panicles 8–30 cm. long, the branches stiffly ascending to spreading, the lower ones sometimes as much as 10 cm. long, pilose in the axils; spikelets 4–5 mm. long, 6- to 12-flowered, rarely more, short-pedicellate, usually crowded, appressed; lemma about 2 mm. long, acute, or subacuminate, scabrous on the keel near the summit.

Moist savannas, fields and waste places, especially along ditches, Trinidad and British Honduras to Brazil and Bolivia.



CHIRIQUÍ: Dolega, *Hitchcock* 8336; David, *Hitchcock* 8353. COCLÉ: Aguadulce, *Pittier* 4891, 4930. CANAL ZONE: Gatún, *Hitchcock* 7975; Culebra, *Hitchcock* 7930; Corozal, *Hitchcock* 7986; Ancón, *Killip* 4119; Chivi Chivi Trail, *Killip* 4087. PANAMÁ: Matías Hernández, *Pittier* 6780, 6920; *Standley* 32019; Panamá, *Hitchcock* 8407; Chorrera, *Hitchcock* 8137, 8153, 8154½; Pacora River, *Killip* 4227; Chepo, *Pittier* 4524.

8. ERAGROSTIS DOMINGENSIS (Pers.) Steud. Syn. Pl. Glum. 1:278. 1854.

*Poa domingensis*, Pers. Syn. Pl. 1:88. 1805.

*Eragrostis maxima* Fourn. Mex. Pl. 2:114. 1886.

Perennial; culms relatively stout, erect, mostly 1–2 m. high, frequently with a few branches from the middle nodes; sheaths firm, usually longer than the internodes; blades firm, flat, elongate, attenuate, as much as 7 mm. wide, smooth beneath, scabrous on the upper surface and on the margins; panicle narrow, dense, elongate, the branches ascending or appressed, floriferous to the base; spikelets 5–10 mm. long, 10- to 16-flowered, appressed, the pedicels much shorter than the spikelets; glumes acute, about 1 mm. long; lemmas 1.8–2 mm. long, acute; palea nearly as long as the lemma.

Brackish marshes, often growing in large clumps, the West Indies and south-eastern Mexico to Colombia.

PANAMÁ: Bella Vista, *Killip* 4039; Panamá, *Hitchcock* 8100.

## 11. UNIOLA L.

UNIOLA L. Sp. Pl. 71. 1753.

*Chasmanthium* Link, Hort. Berol. 1:159. 1827.

Spikelets laterally compressed, few- to several-flowered, the rachilla disarticulating above the glumes and between the florets (tardily or not at all disarticulating in our species), with 1–4 empty lemmas below the fertile florets; glumes narrow, compressed-keeled, acute or acuminate, the first 1- to 5-nerved, the second 3- to 5-nerved; lemmas compressed-keeled, 5- to several-nerved, the nerves often obscure, acute or acuminate, awnless or sometimes mucronate; palea shorter than the lemma, the keels straight (in our species) or prominently bowed.

Slender to coarse perennials with flat or convolute blades and open or usually narrow and rather dense panicles of compressed spikelets.

1. UNIOLA PITTIERI Hack. Oesterr. Bot. Zeitschr. 52:309. 1902.

Stout, glabrous, extensively stoloniferous perennial; culms in large coarse clumps 55–100 cm. high, some of the internodes elongate with 2–4 very short ones between them, the leaves thus appearing in groups; sheaths rounded, glabrous, villous in the throat and on the margins; blades elongate, very firm, attenuate to a fine tip, 8–10 mm. wide toward the base, flat but soon becoming convolute, usually curled toward the ends, glabrous below, more or less scabrous on the upper surface and on the margins; panicles usually 20–30 cm. long, 3–6 cm. wide, dense, interrupted below; spikelets very shortly pedicellate, very flat, 1–2 cm. long, 8–10



mm. wide; lemmas ovate, acute, ciliate on the keel, the margins densely villous at the base, otherwise glabrous; palea about two-thirds as long as the lemma, narrow, the keels not bowed out, ciliate with fine hairs which protrude beyond the margin of the lemma.

Sandy sea beaches, Mexico to Ecuador.



Fig. 9. *Uniola pittieri*

CHIRIQUÍ: *Pittier 5745*. CANAL ZONE: Balboa, *Standley 27151*. PANAMÁ: Bella Vista, *Killip 4034, 12018*; Panamá, *Pittier 4071*; *Hitchcock 8098*; Point Chamé, *Hitchcock 8155*; Taboga Island, *Hitchcock 8070*; Woodson, *Allen & Seibert 1493*; Perlas Islands, *Allen 2587*.

## 12. PHRAGMITES Trin.

PHRAGMITES Trin. Fund. Agrost. 134. 1820.

Spikelets several-flowered, the rachilla densely covered with long fine silky



hairs, disarticulating above the glumes and at the base of each segment between the florets, the first floret staminate or neuter, the others perfect; glumes unequal, narrow, acute, the first 1-nerved, the second 3-nerved; lemmas narrow, long-acuminate, each one successively smaller, the summits of all of them thus about equal; palea of staminate or neuter floret one-fourth as long as the lemma, that of the first fertile floret one-half as long as the lemma.

Coarse rhizomatous stoloniferous reed-like perennial with firm flat blades and large silky plume-like panicles.

1. *PHRAGMITES COMMUNIS* Trin. Fund. Agrost. 134. 1820.

Coarse rhizomatous stoloniferous perennial, usually growing in large colonies; culms erect, reed-like, 2–5 m. high; sheaths glabrous, much longer than the internodes; blades as much as 50 cm. long, 1–2.5 cm. wide, flat, firm, attenuate-pointed, with very scabrous margins; panicles 25–50 cm. long, plume-like, drooping, the branches naked below, densely villous in the lower axils; spikelets 12–20 mm. long; glumes unequal, the first 4–5 mm. long, the second 6–8 mm. long; lemma 10–13 mm. long, narrowly acuminate; rachilla hairs more than half as long as the lemma.

Marshes and wet places in temperate regions around the world, extending into the Tropics.

CHIRIQUÍ: El Boquete, *Hitchcock 8261*. COLÓN: Colón, *Piper 5231*. CANAL ZONE: Barro Colorado Island, *Bailey & Bailey 102*; Gatún Lake, *D. H. Popenoe 46*.

13. *CORTADERIA* Stapf

*CORTADERIA* Stapf, Gard. Chron. III. 22:378, 396. 1897.

Spikelets several-flowered, the rachilla disarticulating near the base of each segment forming a stipe to the floret, the lower part of the stipe glabrous, the upper part covered with long silky hairs; glumes narrow, long-acuminate, 1-nerved, longer than the first floret, sometimes longer than all the florets (in our species); lemmas 3-nerved, villous with long silky hairs, long-acuminate, tapering to a thin fine point, or awned from between the thin slender teeth of a bifid apex; palea about as long as the lemma.

Low or usually tall coarse tussock grasses, the leaves mostly crowded toward the base of the plant, with firm, elongate blades tapering to a slender point, very scabrous on the margins, and rather small to large, dense, silky, plume-like panicles.

1. *CORTADERIA NITIDA* (H.B.K.) Pilger, Bot. Jahrb. (Engler) 37:375. 1906.

Coarse erect perennial; culms 1–1.5 m. high; sheaths all longer than the internodes, glabrous, the lowermost crowded, becoming flattened and coiled at the base of the plant with age; blades elongate, 3–5 mm. wide, flat but becoming involute, very scabrous on the margins, hairy on the upper surface toward the base; panicles 10–30 cm. long, silvery or tinged with gold or purple, the branches ascending or spreading, rather lax, sometimes naked at the base; spikelets 10–14 mm. long, mostly 3-flowered, the glumes narrow, acuminate, exceeding the florets; lemmas



7-8 mm. long, acuminate, bifid, the awned teeth 1-2 mm. long, the awn 4-10 mm. long.

Ravines and bogs at high altitudes, Costa Rica to Peru.

CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock 8219*.

#### 14. GYNERIUM Willd.

GYNERIUM Willd. ex Beauv. Ess. Agrost. 138. *pl. 24. f. 6.* 1812.

Dioecious; staminate spikelets 2-flowered; glumes equal, 1-nerved, acute, thin and hyaline; lemmas 3-nerved, acute, glabrous, awnless; pistillate spikelets 2-flowered; first glume 1- to 3-nerved, acute, thin and hyaline, the second 3-nerved, firmer, narrower, more than twice as long as the first; rachilla glabrous, disarticulating at the base of each segment; lemmas small, attenuate to a long soft awn, villous with long white hairs.

Very large perennial with short-jointed culms, broad, flat blades and large plume-like panicles.

1. GYNERIUM SAGITTATUM (Aubl.) Beauv. Ess. Agrost. 138. *pl. 24. f. 6.* 1812.

*Saccharum sagittatum* Aubl. Pl. Guian. 1:50. 1775.

*Gynerium saccharoides* Humb. & Bonpl. Pl. Aequin. 2:105. *pl. 115.* 1813.

*Arundo saccharoides* Poir. in Lam. Encycl. Suppl. 4:703. 1816.

Very coarse, tall, leafy, perennial reed; culms as much as 15 m. high, with short internodes; sheaths much longer than the internodes, with a long densely villous patch on the back below the blade, also villous in the throat and on the margins near the summit, reticulate-veined, the lower ones soon falling off; blades sharply serrate, commonly 2 m. long, 4-6 cm. wide, forming a great fan-shaped summit to the sterile culms; panicles 1 m. or more long, erect, the branches drooping; pistillate spikelets: glumes very unequal, the first about 4 mm. long, the second 10-12 mm. long; body of lemma about 2 mm. long, tapering gradually into a soft delicate awn 3-4 mm. long, the hairs on the lemma exceeding the awns; staminate spikelets: glumes acute or subacuminate, the first 2-3 mm. long, the second a little broader, about 3 mm. long; lemmas 3 mm. long, acuminate, glabrous.

Swamps, river banks, and low ground, rarely on hillsides, at low altitudes, southern Mexico and the West Indies to Paraguay.

CANAL ZONE: Toro Point, *Hitchcock 8048*; Fort Sherman, *Standley 31207*; between Mindi and Colón, *Hitchcock 7946*.

#### 15. STREPTOGYNE Beauv.

STREPTOGYNE Beauv. Ess. Agrost. 80. *pl. 16. f. 8.* 1812.

Spikelets 3- to 4-flowered, short-pedicellate in elongate one-sided racemes; glumes unequal, the second about twice as long as the first, much shorter than the florets; rachilla disarticulating above the glumes and between the floret, glabrous, narrowed and curved toward the summit, fitting into the hollow of the callus,



the articulation oblique; lemma elongate, firm, cylindrical, tapering into a slender awn, the callus extending below the point of articulation; stigmas elongate, coiled, persistent, the mature fruits hanging by these entangled stigmas.

Perennials with elongate flat blades and solitary long narrow racemes.

1. *STREPTOGYNE CRINITA* Beauv. Ess. Agrost. 80. *pl.* 16. *f.* 8. 1812.

Slender to rather coarse erect perennial; culms 70–120 cm. high, glabrous; sheaths elongate, glabrous or hirsute toward the summit, with short firm ciliate auricles extending nearly across the back; blades flat, as much as 70 cm. long, 10–22 mm. wide, long-acuminate, gradually narrowed to a long petiole-like base, smooth or scaberulous, dark green; raceme 30–50 cm. long, the spikelets appressed; glumes unequal, acuminate, the first narrow, 6–8 mm. long, the second much broader, 12–15 mm. long, sometimes awn-pointed; lemmas 20–23 mm. long, glabrous, the nerves evident only at the summit, the awn about 2 cm. long.

Wet forests at low altitudes, Mexico (Veracruz) and Trinidad to northern Brazil.

CANAL ZONE: Frijoles, *Standley* 27480. PANAMÁ: Río Indio, *Steyermark* & *Allen* 17459.

16. *ORTHOCLADA* Beauv.

*ORTHOCLADA* Beauv. Ess. Agrost. 69. *pl.* 14. *f.* 9. 1812.

Spikelets falling entire, 1- to 2-flowered, the florets distant, the second rudimentary; glumes acuminate, awnless, the first narrow, 3-nerved, the second broader, 5-nerved; lemma acuminate, awn-pointed, 5-nerved, the nerves obscure except near the summit.

Perennials with lanceolate, flat, transversely veined, petiolate blades, and large diffuse panicles, the branches spikelet bearing only near the ends.

1. *ORTHOCLADA LAXA* (L. Rich.) Beauv. Ess. Agrost. 70, 149, 168. 1812.

*Aira laxa* L. Rich. Act. Soc. Hist. Nat. Paris 1:106. 1792.

*Panicum rariflorum* Lam. Encycl. 4:746. 1798.

*Orthoclada rariflora* Beauv. Ess. Agrost. 70. *pl.* 14. *f.* 9. 1812.

Erect or decumbent-spreading, sparingly stoloniferous perennial; culms 60 cm. to more than 2 m. long, glabrous; sheaths rather densely pilose or sometimes nearly glabrous, usually shorter than the internodes; ligule a very short ciliate membrane; blades 5–17 cm. long, 1–3 cm. wide, acuminate, narrowed at the base to a petiole 2–3 cm. long, hispid on the upper surface, glabrous below with conspicuous cross-veins; panicle diffuse, 15–30 cm. long, about as wide, the branches rather readily disarticulating, stiffly spreading, spikelet bearing only at the ends; spikelets 6–7 mm. long; glumes subequal, acuminate, 3–4 mm. long, the first 3-nerved, the second 5-nerved, scabrous on the nerves; lemma about 6 mm. long, 5-nerved, sparsely scabrous.

Moist woods, thickets, and stream banks, Mexico to Brazil and Peru.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart* 71; Old Bank Island, *von Wedel* 2019,



2167; Changuinola Valley, *Dunlap 181A, 186*. CHIRIQUÍ: Río Dupí, *Pittier 5220*. CANAL ZONE: Fort Sherman, *Standley 31108*; Las Cruces, *Pittier 2324, 2615*; Frijoles, *Maxon 4700; Pittier 2682; Killip 4285*; Barro Colorado Island, *Bailey & Bailey 86; Standley 31340*; Darién, *Standley 31639*; Obispo, *Standley 31730*; Las Cascadas, *Killip 4254; Maxon 4678*; Culebra, *Hitchcock 9209*; East Paraíso, *Standley 29923, 29974*. PANAMÁ: Río Chagres, *Dodge & Allen 17353*; Orange River, *Cornman 607*; Río Tapia, *Hitchcock 22949*; Juan Díaz, *Standley 30576*; Río Tecúmen, *Hunter & Allen 217*.



Fig. 10. *Orthoclada laxa*



## 17. ZEUGITES P. Br.

ZEUGITES P. Br. Civ. Nat. Hist. Jam. ed. 2. 341, and Index II. 1789.

*Senites* Adans. Fam. Pl. 2:39. 1763. Ineffectively published.

*Despretzia* Kunth, Rév. Gram. 2:485. pl. 157. 1831.

Spikelets few- to several-flowered, the lowest floret pistillate, the rest staminate, the rachilla joint between the perfect and staminate florets usually elongate; articulation below the glumes, the spikelets falling entire; glumes subequal, broad, obtuse or truncate, often irregularly toothed or lobed, conspicuously cross-veined; lemma of fertile floret broad, usually obtuse, the staminate florets narrower, acutish or subobtuse.

Very slender to rather coarse perennials with broad, flat, usually thin, transversely veined petiolate blades and open panicles.

- a. Culms very slender, decumbent-spreading, not more than 50 cm. long; blades thin, ovate, not more than 3.5 cm. long ..... 1. *Z. MEXICANA*  
 aa. Culms coarse, erect, about 1 m. high; blades relatively thick, lanceolate, more than 10 cm., usually more than 15 cm., long..... 2. *Z. PANAMENSIS*

1. *ZEUGITES MEXICANA* (Kunth) Trin. ex Steud. Nom. Bot. ed. 2. 2:798. 1841.

*Despretzia mexicana* Kunth, Rév. Gram. 2:485. pl. 157. 1831.

*Zeugites colorata* Griseb. Fl. Brit. W. Ind. 536. 1864.

*Senites mexicana* Hitchc. Contr. U. S. Nat. Herb. 17:370. 1913.

Very slender, decumbent-spreading perennial; culms 15–50 cm. long, wiry, usually rather freely branching, purple, shining, with a sulcus on one side; sheaths usually much shorter than the internodes, sparsely pilose or glabrous; blades 1.5–3.5 cm. long, 6–16 mm. wide, ovate, acute, thin, glabrous or very sparsely pilose, the petioles 6–10 mm. long; panicles 6–9 cm. long, the slender more or less flexuous, few-flowered branches ascending or spreading, the lower ones often reflexed; spikelets 5–6 mm. long; glumes equal, 1.5–2 mm. long, about half as long as the fertile floret; staminate florets 1 or 2, about 3 mm. long.

Rich woods at medium altitudes, southern Mexico to Bolivia.

PANAMÁ: Volcán de Chiriquí, *Hitchcock 9198*.

2. *ZEUGITES panamensis* Swallen, sp. nov.

Perennis; culmi erecti ca. 1 m. alti, pauciramosi; vaginae internodiis multo longiores, glabrae superne carinatae; ligula 1 mm. longa, membranacea, erosa; laminae 9–21 cm. longae, 2–4.8 cm. latae, late lanceolatae, acuminatae, subcordatae, glabrae, petiolis 2–20 mm. longis; paniculae 10–15 cm. longae, 10–12 cm. latae, ramis adscendentibus vel reflexis; spiculae 8–12 mm. longae, 4–6-florae, pedicellis 2–10 (–15) mm. longis; glumae aequales, 5 mm. longae, obtusae, 7-nerves, glabrae, virides vel purpurascens; flores feminei: lemma 6 mm. longum, saccatum, obtusum vel subacutum, marginibus minute ciliolatis; flos masculus primus 5 mm. longus, lemmate subobtusum, non saccatum; stamina 2 mm. longa.

Perennial; culms erect, about 1 m. high, sparingly branched; sheaths much longer than the internodes, glabrous, distinctly keeled toward the truncate sum-



Fig. 11. *Zeugites mexicana*

mit, with rather prominent cross-veins toward the margins; ligule membranaceous, somewhat erose, about 1 mm. long; blades 9–21 cm. long, 2–4.8 cm. wide, broadly lanceolate, acuminate, rounded or subcordate at the base, glabrous, conspicuously cross-veined, the petioles stout, 2–20 mm. long; panicles 10–15 cm. long, 10–12 cm. wide, the branches ascending to reflexed, the branchlets appressed, becoming divaricate with age; spikelets 8–12 mm. long, 4- to 6-flowered, the first floret pistillate, the others staminate, the pedicels 2–10 mm. long or sometimes even as much as 15 mm. long; glumes equal, 5 mm. long, obtuse (the first rarely sub-



acute), somewhat narrowed toward the base, 7-nerved, strongly cross-veined, glabrous, more or less tinged with purple; lemma of pistillate floret about 6 mm. long, saccate, obtuse, broadly acute, minutely ciliolate on the margins; palea as long as the lemma, broad, folded inward bringing the rather distant keels close together; first staminate floret about 5 mm. long, the others successively smaller, subobtuse, not saccate; stamens 2 mm. long.

PANAMÁ: hills above Campana, alt. 600–800 m., *Allen 1318* (TYPE).

Related to *Z. pittieri* Hack., which is as much as 3½ m. high with prominently viscid panicles commonly 30 cm. long, the very stiff branches arranged in fascicles; the blades are as much as 30 cm. long and 7 cm. wide, and there are 10–12 staminate florets in each spikelet. Resembling *Z. capillaris* (Hitchc.) Swallen, comb. nov. (*Senites capillaris* Hitchc.), but the panicle branches of this species are very slender, the spikelets are on long capillary pedicels, and the second glume is much smaller, scarcely, if at all, reaching the first staminate floret. *Z. hackelii* Swallen, nom. nov. (*Zeugites pittieri* var. *pringlei* Hack., not *Z. pringlei* Scribn.) differs in having usually conspicuously dentate glumes and larger blades as much as 32 cm. long and 10 cm. wide.

#### 18. JOUVEA Fourn.

JOUVEA Fourn. Bull. Soc. Bot. Belg. 15:475. 1877.

Dioecious; staminate spikelets several to many-flowered, sessile, somewhat distant on opposite sides of the rachis, forming a terminal loose spike, the florets closely imbricate; glumes shorter than the first floret; lemmas 3-nerved, acute, awnless; pistillate spikelets in the axils of the leaves, single or in fascicles of 3 or 4, terete, somewhat curved, acuminate, consisting of 1–3 florets imbedded in the spongy tissue of the thickened rachilla, only the summit of the floret free; style and base of stigma elongate, 2-lobed.

Tough, wiry, stoloniferous perennials.

1. JOUVEA STRAMINEA Fourn. Bull. Soc. Bot. Belg. 15:475. 1877.

Tough, wiry, extensively stoloniferous perennial; culms slender, erect from a dense knotty crown, branching, 10–35 cm., rarely as much as 60 cm. high; lowermost sheaths very short, crowded, with reduced blades, the upper ones much shorter than the long internodes, glabrous, villous at the throat; blades flat or becoming involute, firm, stiffly ascending or spreading, 2–6 cm. long, 1–3 mm. wide, scabrous; staminate inflorescences 2–3 cm. long, scarcely exerted from the sheath, bearing 2–3 spikelets; spikelets 4- to 8-flowered; glumes acuminate, unequal, the first sometimes much reduced, the second 4–5 mm. long; lemmas acute or acuminate, about 4 mm. long, glabrous; anthers 2 mm. long; pistillate inflorescences 2–3 together, not crowded; spikelets 15–25 mm. long, 2- to 4-flowered, slender, pointed, arcuate.



Fig. 12. *Jouvea straminea*

Salt marshes along the coast, Mexico (Acapulco) to Panama.

PANAMÁ: abundant at Bella Vista, Piper 5277.

### 19. TRisetum Pers.

TRisetum Pers. Syn. Pl. 1:97. 1805.

*Graphophorum* Desv. Nouv. Bull. Soc. Philom. (Paris) 2:189. 1810.

Spikelets 2- to 3-flowered, the rachilla usually villous, disarticulating above the glumes and between the florets (in our species), prolonged beyond the uppermost floret; glumes somewhat unequal, acute, the second usually longer than the first floret; lemmas usually short-bearded at the base, 2-toothed at the apex, bear-



ing from the back, below the cleft apex, a straight and included or usually geniculate and exserted awn (minutely lobed and awnless or nearly so in *T. pringlei*).

Slender to tall and rather coarse perennials with flat narrow blades and open or usually narrow and rather dense panicles.

- a. Culms 15–45 cm. high; lemmas awnless or nearly so, minutely lobed. 1. *T. PRINGLEI*  
 aa. Culms 50–120 cm. high; lemmas awned, the awn 7–10 mm. long, geniculate.  
 b. Panicles silvery, almost plume-like from the copious callus hairs protruding from the glumes; glumes nearly equal in size and shape, narrow, 1-nerved ..... 2. *T. DEYEUXIOIDES*  
 bb. Panicles greenish or purplish, not plume-like, the callus hairs short; glumes unequal, the first 1-nerved, the second broader, 3-nerved..... 3. *T. IRAZUENSE*

1. *TRisetum PRINGLEI* (Scribn.) Hitchc. Proc. Biol. Soc. Washington 40:82. 1927.

*Graphophorum pringlei* Scribn. in Beal, Grasses N. Amer. 2:561. 1896.

Slender, densely tufted perennial; culms erect, 15–45 cm. high, glabrous; leaves mostly crowded toward the base in a dense cluster, softly and rather densely pubescent; blades firm, convolute, navicular, erect, 4–12 cm. long; panicles narrow, lax, somewhat drooping, 7–12 cm. long, the short slender scabrous branches ascending, sometimes flexuous, often naked at the base; spikelets 4–5 mm. long, 2-flowered, the florets distant, the upper one readily deciduous; glumes glabrous, unequal, the first 1.5–2 mm. long, 1-nerved, the second 3 mm. long, 3-nerved; first lemma 3.5 mm. long, 5-nerved, densely pubescent, rounded, obtusish, minutely notched, rarely with a short awn; second lemma similar but smaller; rachilla densely hairy.

Paramos at high altitudes, Mexico (Oaxaca), Costa Rica, and Panama.

CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock* 8222, 8228.

2. *TRisetum DEYEUXIOIDES* (H.B.K.) Kunth, Rév. Gram. 1:102. 1829.

*Avena deyeuxioides* H.B.K. Nov. Gen. & Sp. 1:147. 1815.

*Trisetaria deyeuxioides* Poir. in Lam. Encycl. Suppl. 5:366. 1817.

*Avena trichopodia* Presl, Rel. Haenk. 1:254. 1830.

*Deyeuxia triflora* Nees, Linnaea 19:691. 1847.

Slender lax perennial; culms erect or decumbent-spreading at the base, 70–120 cm. high, simple or sparingly branching; sheaths glabrous, usually longer than the internodes; ligule thin, truncate, 2–4 mm. long; blades 8–25 cm. long, 2–6 mm. wide, scabrous, sometimes pilose on the upper surface; panicles 10–25 cm. long, narrow, silvery, the short branches ascending, somewhat flexuous, spikelet bearing nearly to the base; spikelets 5–6 mm. long, 2-flowered; both glumes narrow, 1-nerved, subequal, nearly as long as the spikelet; lemmas narrowly lanceolate, glabrous, the hyaline tip bifid, the lower one 4.5–5 mm. long, the callus densely hairy, the hairs about 3 mm. long; awn 7–8 mm. long, fine, twisted below, attached about the middle; rachilla conspicuously hairy, the hairs at the summit of each segment much longer than the rest, reaching more than half the length of the lemma.



Grassy banks and thickets at medium altitudes, Mexico to Ecuador.

CHIRIQUÍ: El Boquete, *Hitchcock* 8253.

3. *TRisetum IRAZUENSE* (Kuntze) Hitchc. Proc. Biol. Soc. Washington 40:82. 1927.

*Trisetum gracile* Fourn. Mex. Pl. 2:108. 1886. Not *T. gracile* Boiss., 1845.

*Calamagrostis irazuensis* Kuntze, Rev. Gen. Pl. 2:763. 1891.

*Trisetum fournieranum* Hitchc. Contr. U. S. Nat. Herb. 17:326. 1913.

*Trisetum scabriflorum* Hitchc. Contr. U. S. Nat. Herb. 24:358. 1927.

Loosely tufted, erect or somewhat decumbent perennial; culms flattened, 50–90 cm. high, glabrous; lower sheaths crowded, densely villous, the upper distant, elongate, glabrous or nearly so; ligule erose, truncate, about 1 mm. long; blades flat, mostly 8–15 cm. long, 2–4 mm. wide, sparsely pilose on both surfaces; panicles 12–20 cm. long, suberect or nodding, the branches usually ascending, somewhat flexuous, some of them naked at the base for 1–2 cm., as much as 7 cm. long; spikelets 5–8 mm. long, 2- to 3-flowered; glumes shorter than the spikelet, the first 4–5 mm. long, 1-nerved, narrow, acuminate, the second much broader, 5–6 mm. long, 3-nerved, abruptly acuminate; lemmas lanceolate, slightly toothed, 5-nerved, scabrous and minutely wrinkled on the back, the lowest one 5–6 mm. long; awn 7–10 mm. long, twisted in the lower third, inserted about one-third from the tip of the lemma.

Paramos at high altitudes, mostly above 3000 m., Mexico to Ecuador.

CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock* 8209, 8221, 8224; *Davidson* 1046; *Woodson & Schery* 403.

## 20. AGROSTIS L.

AGROSTIS L. Sp. Pl. 61. 1753.

*Vilfa* Adans. Fam. Pl. 2:495. 1763.

Spikelets 1-flowered, the rachilla disarticulating above the glumes, not prolonged beyond the floret (in our species); glumes equal, longer than the floret, acute or acuminate; lemma usually obtuse, thinner than the glumes, awned from the back or awnless, glabrous or more or less hairy on the callus; palea obsolete (in our species).

Slender perennials with flat or involute blades and open panicles of small spikelets.

- a. Culms 10–40 cm. high, the blades all involute, or those of the culm flat but narrow, crowded toward the base in a dense cluster; lemma 2 mm. long, the callus sparsely hairy on the sides, the awn inserted about one-fourth above the base ..... 1. *A. HOFFMANNI*
- aa. Culms 50–60 cm. high; blades of the innovations involute-filiform, those of the culm flat, 1.5–3 mm. wide; lemma 1.5 mm. long, the callus glabrous, the awn inserted above the middle..... 2. *A. VIRESCENS*

1. *AGROSTIS HOFFMANNI* Mez, Repert. Sp. Nov. (Fedde) 18:3. 1922.

Densely tufted perennial; culms erect, 10–40 cm. high; sheaths glabrous; ligule 2–3 mm. long, thin, hyaline; blades involute, filiform, or the upper ones sometimes



flat and 1 mm. wide, scabrous, the lower ones crowded together at the base of the plant; panicles 3–8 cm. long, narrow, dense or somewhat loose, the short branches usually appressed, not more than 2 cm. and usually less than 1 cm. long; spikelets 3 mm. long; glumes acuminate, scabrous on the keel; lemma about 2 mm. long, including the short teeth, the callus hairy on the sides; awn attached about one-fourth from the base, tightly twisted below, geniculate and protruding from the glumes, the exerted portion about 3 mm. long; palea obsolete.

Paramos and peaks of high mountains, Costa Rica and Panama.

CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock* 8207, 8217, 8223; *Maxon* 5358; *Killip* 4548; *Pittier* 3101; *Davidson* 1045; *Woodson & Schery* 425.

2. *AGROSTIS VIRESCENS* H.B.K. Nov. Gen. & Sp. 1:135. 1815.

Erect tufted perennial; culms 45–60 cm. high; sheaths glabrous, longer than the internodes; ligule 3–5 mm. long, hyaline; innovation blades involute, filiform, soft, those of the culm 6–15 cm. long, 1.5–3 mm. wide, flat, scabrous; panicles 10–15 cm. long, green, the branches in rather distant verticils, as much as 6 cm. long, appressed or narrowly ascending, spikelet bearing to the base; spikelets 3 mm. long; glumes acuminate, scabrous on the keel; lemma 1.5 mm. long, the callus glabrous, the awn inserted slightly above the middle, twisted below, geniculate, protruding from the glumes, the exerted portion about 3 mm. long; palea obsolete.

Paramos at high altitudes, Mexico to Bolivia.

CHIRIQUÍ: Volcán de Chiriquí, *Pittier* 3103; *Woodson & Schery* 415.

21. CINNA L.

CINNA L. Sp. Pl. 5. 1753.

*Abola* Adans. Fam. Pl. 2:31, 511. 1763.

*Cinnastrum* Fourn. Mex. Pl. 2:90. 1886.

Spikelets 1-flowered, disarticulating below the glumes, falling entire; glumes equal, 1-nerved, about as long as the floret; rachilla forming a stipe below the floret, produced beyond the palea as a minute bristle; lemma similar to the glumes, 3-nerved, bearing a minute awn just below the apex; palea a little shorter than the lemma, apparently 1-keeled.

Slender to rather coarse perennials with flat blades and open, loose, drooping panicles.

1. *CINNA POAEFORMIS* (H.B.K.) Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 24:21. 1901.

*Deyeuxia poaeformis* H.B.K. Nov. Gen. & Sp. 1:146. 1815.

*Poa subuniflora* Kunth, Rév. Gram. 115. 1829.

*Cinnastrum poaeforme* Fourn. Mex. Pl. 2:91. 1886.

*Cinnastrum miliaceum* Fourn. Mex. Pl. 2:91. 1886.

Erect perennial; culms slender to rather coarse, 80 cm. to more than 2 m. high; sheaths glabrous, shorter than the internodes; ligule 5–15 mm. long, thin, lacerate; blades 10–30 cm. long, 5–10 mm. wide, flat, acuminate, glabrous or



scaberulous, the margins finely scabrous; panicles 15–40 cm. long, the slender drooping branches in distant verticils, naked in the lower half, some of them often as much as 15 cm. long; spikelets somewhat densely clustered, short-pedicellate, 2.5–2.8 mm. long; glumes usually very scabrous; awn of lemma obscure; rudiment slender, glabrous.

Moist thickets, forests, and banks, Mexico to Peru.

CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock* 8215; *Killip* 4547.

## 22. POLYPOGON Desf.

POLYPOGON Desf. Fl. Atlant. 1:66. 1798.

*Santia* Savi, Mem. Soc. Ital. Modena 8<sup>1</sup>:479. 1799.

*Raspailia* Presl, Rel. Haenk. 1:238. *pl.* 40. 1830.

*Nowodworskya* Presl, Rel. Haenk. 1:351. 1830.

Spikelets 1-flowered, disarticulating below the glumes; glumes equal, similar, awned from the tip or from between minute lobes, the awns slender, straight; rachilla not produced beyond the florets; lemma much shorter than the glumes, hyaline, with a straight slender awn, shorter than the awns of the glumes; palea present.

Somewhat coarse, erect or decumbent perennial (in our species) grasses with flat blades and narrow, often elongate, dense panicles.

### 1. POLYPOGON ELONGATUS H.B.K. Nov. Gen. & Sp. 1:134. 1815.

Rather coarse perennial; culms erect or usually decumbent-spreading at the base, as much as 1 m. long, glabrous; sheaths glabrous, shorter than the internodes; ligules thin, obtuse, 3–5 mm. long; blades 10–30 cm. long, 5–10 mm. wide, smooth and shining beneath, scabrous above and on the margins; panicles 10–35 cm. long, nodding, narrow and rather dense, interrupted, the branches in rather distant verticils, floriferous to the base; glumes about 3 mm. long, aristate, gradually narrowed into the awn, very scabrous; lemma 1.5 mm. long with a slender awn about 2 mm. long.

Marshes, stream banks, moist cliffs, and wet places, Mexico to Argentina.

CHIRIQUÍ: El Boquete, *Hitchcock* 8232; *Maxon* 5234; *Killip* 4515; New Switzerland, *Allen* 1409.

## 23. PEREILEMA Presl

PEREILEMA Presl, Rel. Haenk. 1:233. 1830.

Spikelets 1-flowered, in dense fascicles along the axis of a panicle, surrounded by numerous sterile spikelets in the form of bristles; rachilla disarticulating above the glumes, not produced beyond the floret; glumes equal, 1-nerved, thin, minutely lobed, awned from between the lobes, the awn slender, straight; lemma terete, pilose below, minutely bifid, the midnerve extending into a slender, flexuous, thread-like awn longer than the bristles; palea as long as the lemma, the keels approximate.



Annuals with narrow flat blades and dense interrupted panicles of small awned spikelets.

1. *PEREILEMA CRINITUM* Presl, Rel. Haenk. 1:233. *pl.* 37. *f. a.* 1830.

*Pereilema crinitum* var. *cirratum* Fourn. Mex. Pl. 2:93. 1886.



Fig. 13. *Pereilema crinitum*

Annual; culms 10–40 cm. high, erect or decumbent at the base, branching, especially at the lower nodes; sheaths much longer than the internodes, scabrous, auriculate, the auricles pubescent; ligule very short, truncate; blades 5–20 cm. long, 2–4 mm. wide, gradually tapering to a usually long, petiole-like base, scaberulous; panicles 3–12 cm., rarely 15 cm., long, narrow, dense, interrupted,



the short branches usually appressed; lemma 1.5 mm. long, scabrous, the very fine flexuous awn about 2 cm. long.

Savannas, brushy slopes, moist banks and waste places, Mexico to Ecuador.

COCLÉ: Olá, *Pittier 5046*. Without locality, *Haenke* (TYPE).

#### 24. MUHLENBERGIA Schreb.

MUHLENBERGIA Schreb. ex Gmel. Syst. Nat. 2:171. 1791.

*Dilepyrum* Michx. Fl. Bor. Amer. 1:40. 1803.

*Podosemum* Desv. Nouv. Bull. Soc. Philom. (Paris) 2:188. 1810.

*Epicampes* Presl, Rel. Haenk. 1:235, pl. 39. 1830.

Spikelets 1-flowered, the rachilla disarticulating above the glumes; glumes very short to as long as the floret, 1-nerved, obtuse to acuminate, awnless or awned; lemma 3-nerved, usually rather firm, 3- to 5-nerved, mucronate or awned, with a short usually pilose callus; palea as long as the lemma or nearly so.

Annuals or perennials with very slender to coarse culms, flat, folded, or involute blades, and narrow, dense, or diffuse panicles of small spikelets.

- a. Low delicate annuals or widely decumbent-spreading perennials.
  - b. Annuals; culms 8–35 cm. high, very slender, erect or decumbent at the base.
    - c. Panicles open, diffuse; lemma 1.5 mm. long; awns about 5 mm. long..... 1. *M. TENUISSIMA*
    - cc. Panicles narrow, the branches usually appressed, spikelet bearing to the base, the spikelets short-pedicellate; lemma 2 mm. long; awns 10–20 mm. long..... 2. *M. TENELLA*
  - bb. Perennials; culms as much as 1 m. long, relatively stout, widely decumbent-spreading, freely branching..... 3. *M. SETARIOIDES*
- aa. Coarse erect perennials, the lower sheaths conspicuously compressed-keeled.
  - b. Panicles 80 cm. long, partly enclosed in the upper sheath, the branches as much as 15 cm. long, naked in the lower half; lemma glabrous or scabrous on the back near the base, the callus short-bearded; awns 3.5–4 cm. long..... 4. *M. ATTENUATA*
  - bb. Panicles 15–40 cm. long, exserted, the branches mostly 5–10 cm. long; lemma villous across the back near the base; awns 1–2 cm. long..... 5. *M. EMERSLEYI*

#### 1. MUHLENBERGIA TENUISSIMA (Presl) Kunth, Rév. Gram. 1: Suppl. XVI. 1830.

*Podosaemum tenuissimum* Presl, Rel. Haenk. 1:230. 1830.

Delicate annual; culms very slender, 8–35 cm. long, freely branching, erect to decumbent-spreading, more or less strigose below the nodes; sheaths shorter than the internodes, glabrous; ligule hyaline, about 1 mm. long; blades 1.5–3.5 cm. long, about 0.5 mm. wide, minutely puberulent on the upper surface, with firm white margins; panicles diffuse, 2–8 cm. long, the branches mostly solitary, filiform, ascending or spreading; pedicels capillary, 3–5 mm. long, spreading, straight or flexuous; glumes acute or subobtuse, the first 0.4 mm. long, the second a little longer; lemma 1.5 mm. long, sparsely pilose, the slender awn 5 mm. long.

Dry savannas, Panama.

CANAL ZONE: Sabana of Panamá, *Pittier 2544*. PANAMÁ: Matías Hernández, *Pittier 6918*; Río Tecúmen, *Standley 29418*; Pacora River, *Killip 4214*; between Panamá and Chepo, *Dodge, Hunter, Steyermark & Allen 16687*. Without locality, *Haenke* (TYPE).



## 2. MUHLENBERGIA TENELLA (H.B.K.) Trin. Gram. Unifl. 192. 1824.

*Podosaemum tenellum* H.B.K. Nov. Gen. & Sp. 1:128. 1815.

*Arundo tenella* Spreng. Pl. Pugill. 2:6. 1815. Not *A. tenella* Schrad., 1806.

*Trichochloa tenella* Roem. & Schult. Syst. Veg. 2:385. 1817.

*Muhlenbergia sprengelii* Trin. Gram. Unifl. 189. 1824.

*Polypogon tenellus* Spreng. Syst. Veg. 1:243. 1825. Not *P. tenellus* R. Br., 1810.

*Polypogon gracilis* Spreng. Syst. Veg. 5:558 (Index). 1828.

*Muhlenbergia exilis* Fourn. Mex. Pl. 2:84. 1886.

Delicate annual; culms 8–20 cm. long, freely branching, erect or usually decumbent-spreading; sheaths pilose or nearly glabrous; ligule 0.5 mm. long; blades 1–3 cm. long, mostly less than 1 mm. wide, flat, pilose, especially on the upper surface; panicles 4–10 cm. long, the branches ascending or appressed, rather distant, solitary, closely flowered to the base, the branchlets appressed; spikelets short-pedicellate, appressed; body of glumes about 0.5 mm. long, abruptly narrowed to a short awn; lemma 2 mm. long, glabrous, the callus minutely pubescent, the awn very slender, mostly 10–20 mm. long.

Savannas, moist banks and rocky ledges, at lower altitudes, Mexico to Panama.

CHIRIQUÍ: El Boquete, *Hitchcock* 8316; road toward Dolega, *Hitchcock* 8331; Cerro Vaca, *Pittier* 5308. COCLÉ: Valley of Río Mata Ahogado, *Allen* 137, 141; El Valle de Antón, *Allen* 2806.

## 3. MUHLENBERGIA SETARIOIDES Fourn. Mex. Pl. 2:84. 1886.

*Muhlenbergia sylvatica* var. *setarioides* Beal, Grasses N. Amer. 2:249. 1896.

*Muhlenbergia polypogonoides* Hack. Ann. Naturhist. Hofmus. Wien 17:255. 1902.

Straggling, freely branching perennial; culms as much as 1 m. long, usually with a long decumbent or creeping rooting base, many-noded, the internodes relatively short, glabrous; sheaths longer or shorter than the internodes, glabrous or scaberulous; ligule 1–2 mm. long, thin, lacerate; blades 2–12 cm. long, 3–8 mm. wide, thin, flat, lax, scabrous; panicles 5–15 cm. long, rather dense, interrupted, the short densely flowered branches narrowly ascending or appressed; spikelets subsessile or short-pedicellate; glumes acuminate, mostly 1.5–2 mm. long, the second a little longer than the first, thin, with a prominent green midnerve; lemma 2 mm. long, acute, pilose on the lower part, scabrous above, the awn 2–10 mm. long, slender, flexuous.

Moist woods and shady banks, Mexico (Veracruz) to Panama.

CHIRIQUÍ: Río Caldera above Boquete, *Killip* 4513.

4. MUHLENBERGIA *attenuata* Swallen, sp. nov.

Perennis; culmi 1.8 m. alti, dense caespitosi, erecti, glabri; vaginae inferiores elongate, compressae, carinatae, scaberulae; ligula 1–2 cm. longa; laminae elongatae, attenuatae, scaberrimae; panicula 80 cm. longa, ramis gracilibus, scabris, adscendentibus, inferioribus ad 15 cm. longis, basi nudis, ramulis appressis; spiculae 2–2.5 mm. longae; glumae acutae vel subacutae lemma subequantes; lemma ca. 2.5 mm. longum, acutum, scabrum, callo breviter villosa; arista 3.5–4 cm. longa, gracilis, flexuosa.



Densely tufted perennial; culms in large clumps 1.8 m. high, erect, glabrous; lower sheaths narrow, elongate, compressed-keeled, scaberulous, the uppermost one 50 cm. long, rounded; ligule thin, lacerate, 1–2 cm. long; blades elongate, attenuate, gradually narrowed to a long fine thread-like end, very scabrous; panicle 80 cm. long, partly enclosed in the upper sheath, the long, slender, scabrous branches narrowly ascending, the lower ones as much as 15 cm. long, naked in the lower half, the branchlets appressed; spikelets 2–2.5 mm. long; glumes acute or subacute, as long as or slightly shorter than the floret, very scabrous; lemma 2.5 mm. long, acute, scabrous, the callus short, villous; awn 3.5–4 cm. long, very slender, somewhat flexuous.

Open ground, Panama.

CHIRIQUÍ: El Boquete, foothills, 1000–1300 m. alt., *Hitchcock* 8174 (U. S. Nat. Herb., TYPE).

5. *MUHLENBERGIA EMERSLEYI* Vasey, *Contr. U. S. Nat. Herb.* 3:66. 1892.

*Muhlenbergia vaseyana* Scribn. *Rep. Mo. Bot. Gard.* 10:52. 1899.

*Epicampes emersleyi* Hitchc. *Bull. U. S. Dept. Agr.* 772:144. 1920.

*Epicampes subpatens* Hitchc. *Bull. U. S. Dept. Agr.* 772:144. 1920.

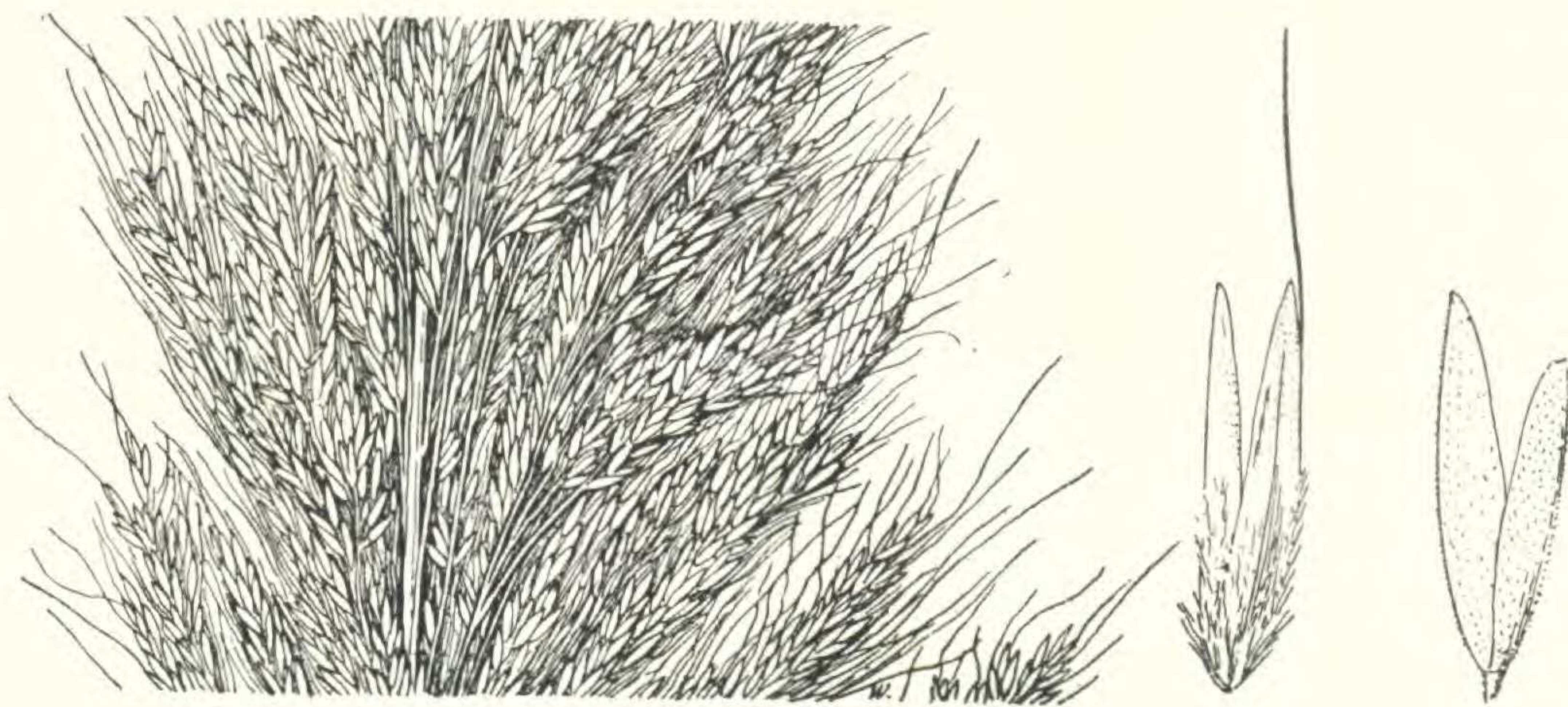


Fig. 14. *Muhlenbergia emersleyi*

Densely tufted perennial; culms erect, 0.5–1 m. high, glabrous; sheaths flattened and keeled, glabrous, the lower ones elongate, all longer than the internodes; ligule thin, lacerate, 1–2 cm. long; blades elongate, conduplicate at the base, 2–4 mm. wide, scabrous, especially on the margins; panicles 15–40 cm. long, narrow, dense, but rather loose, erect, the narrowly ascending branches 5–10 cm. long, naked below for a short distance, or spikelet bearing nearly to the base; spikelets 2–2.5 mm. long; glumes equal, as long as or a little shorter than the floret, acute, scabrous; lemma scabrous above, villous across the back near the base, the awn mostly 1–2 cm. long.

Dry savannas and open grassy hillsides, southwestern United States to Panama.

CHIRIQUÍ: El Boquete, *Hitchcock* 8174, 8241, 8242; Cerro Vaca, *Pittier* 5360; road toward Dolega, *Hitchcock* 8340. COCLÉ: Olá, *Pittier* 5042, 5062; El Valle de Antón, *Allen* 2812.



## 25. SPOROBOLUS R. Br.

SPOROBOLUS R. Br. Prodr. Fl. Nov. Holl. 169. 1810.

*Agrosticula* Raddi, Agrost. Bras. 33. 1823.

*Bennetia* Raf. Bull. Bot. Seringe 1:220. 1830.

*Cryptostachys* Steud. Syn. Pl. Glum. 1:181. 1854.

*Bauchea* Fourn. Mex. Pl. 2:87. 1886.

Spikelets 1-flowered, disarticulating above the glumes; glumes awnless, subequal or usually unequal, the second often as long as the spikelet; lemma 1-nerved, acute to obtuse, awnless; palea as long as or sometimes longer than the lemma.

Annuals or perennials with open or contracted, often spike-like, panicles of small spikelets.

- |  |                  |
|--|------------------|
| a. Plants annual; panicles narrow, dense, purplish.....  | 1. S. CILIATUS   |
| aa. Plants perennial; panicles open, or if dense, green, not purple.   |                  |
| b. Culms wiry, creeping, with hard scaly rhizomes. Seacoast plants....   | 5. S. VIRGINICUS |
| bb. Culms cespitose, erect, without rhizomes.  |                  |
| c. Panicles narrow but open, the branches verticillate, spreading to reflexed; lower sheaths densely ciliate on the margins with long hairs.....     | 2. S. CUBENSIS   |
| cc. Panicles dense and spike-like or somewhat open but the branches ascending or appressed, not verticillate; lower sheaths glabrous on the margins. |                  |
| d. Panicles dense and spike-like; spikelets 2-2.4 mm. long; glumes unequal, the first 0.5 mm. long, the second 0.7-1 mm. long....                    | 3. S. POIRETII   |
| dd. Panicles scarcely dense, the slender branches ascending to spreading; spikelets 1.6-1.8 mm. long; glumes subequal, 0.3-0.5 mm. long.....         | 4. S. INDICUS    |

1. SPOROBOLUS CILIATUS Presl, Rel. Haenk. 1:242. 1830.

*Vilfa ciliata* Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 4<sup>1</sup>:63. 1840. Not *Vilfa ciliata* Beauv. 1812.

*Vilfa preslii* Steud. Nom. Bot. ed. 2. 2:768. 1841.

Low annual; culms erect or decumbent at the base, 4-35 cm. high; sheaths mostly longer than the internodes, glabrous or sparsely papillose-hispid, ciliate on the margins; blades 2.5-10 cm. long, 3-5 mm. wide, flat, acuminate, the margins prominently papillose-ciliate, more or less papillose-pilose or papillose-hispid on both surfaces; panicles 2-12 cm. long, narrow, dense, purplish, the short slender branches appressed, floriferous to the base, sparsely covered with small glands; spikelets 1.6-1.8 mm. long; glumes acute, the first 0.5 mm. long, the second nearly as long as the spikelet; lemma similar but slightly longer than the second glume.

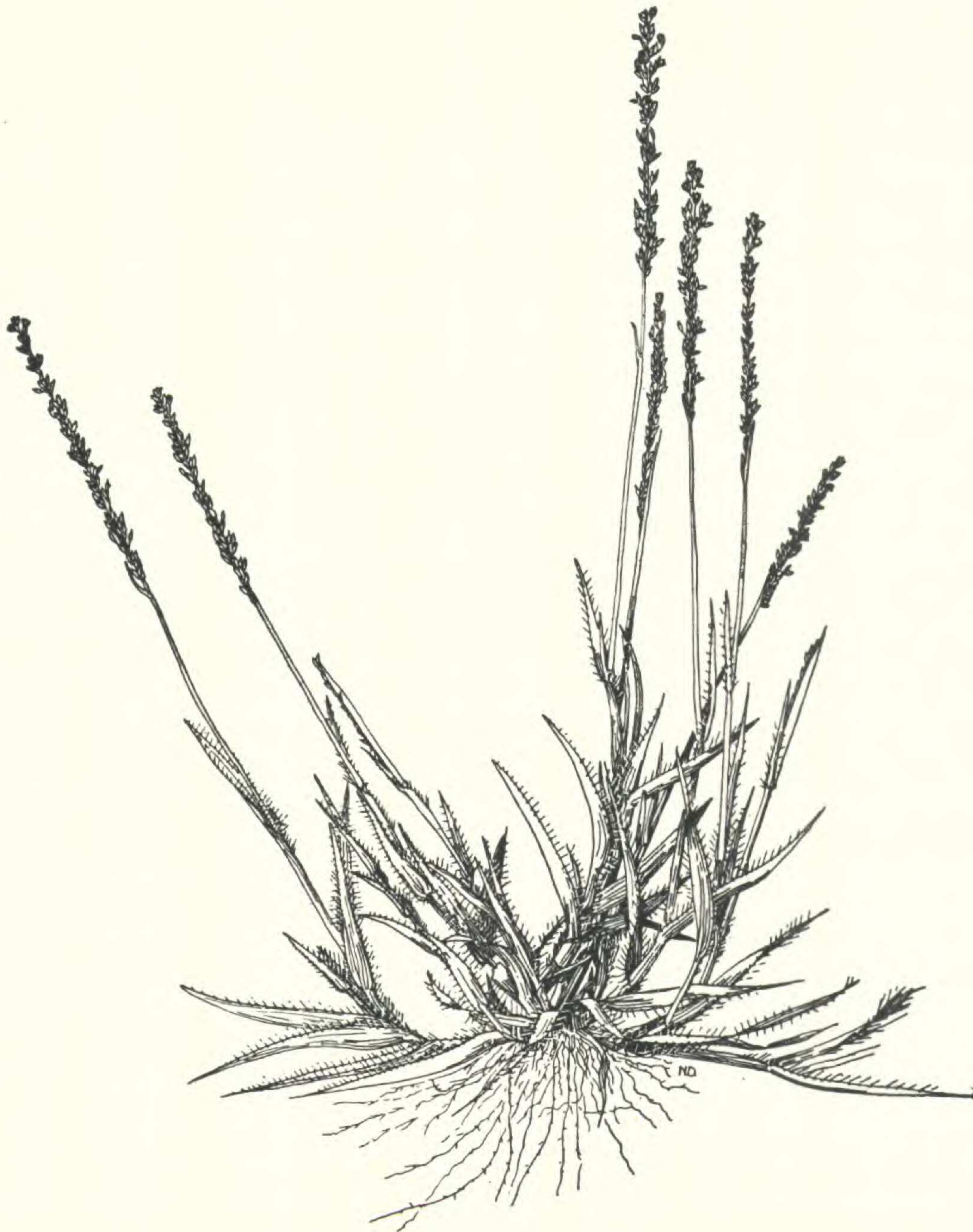
Savannas and grassy slopes at low altitudes, Honduras to Brazil.

CHIRIQUÍ: David, *Hitchcock* 8355, 8376; San Felix, *Pittier* 5195. COCLÉ: Aguadulce, *Pittier* 4865; El Valle de Antón, *Allen* 2807. CANAL ZONE: Corozal, *Killip* 4188; *Hitchcock* 9203. PANAMÁ: Las Sabanas, *Standley* 25908; Hacienda La Joya, *Dodge*, *Hunter*, *Steyermark* & *Allen* 16879; Panamá, *Standley* 26886, 27732; *Hitchcock* 8405; Bella Vista, *Killip* 12033; Juan Díaz, *Killip* 4133. Without locality, *Haenke* (TYPE).

2. SPOROBOLUS CUBENSIS Hitchc. Contr. U. S. Nat. Herb. 12:237. 1909.

Densely tufted perennial; culms erect, 30-60 cm. high; lower sheaths crowded, becoming reddish-brown with age, conspicuously and densely ciliate with long



Fig. 15. *Sporobolus ciliatus*

hairs on the margins, the culm sheaths shorter than the internodes, glabrous; blades flat or folded, 10-30 cm. long, 2-4 mm. wide, tapering toward the base, narrower than the mouth of the sheath, papillose or papillose-ciliate on the margins toward the base; panicles mostly 8-12 cm. long, open, the short branches verticillate, spreading to reflexed, bearing 1-3 spikelets; spikelets 3-4 mm. long; first glume narrow, acuminate, about half as long as the spikelet, the second much broader, acute, as long as the lemma.

Dry savannas and rocky slopes at low altitudes, southern Mexico and the West Indies to Venezuela and British Guiana.

CANAL ZONE: Frijoles, Killip 4344.



3. *SPOROBOLUS POIRETII* (Roem. & Schult.) Hitchc., *Bartonia* 14:32. 1932.*Sporobolus elongatus* Lam. *Tabl. Encycl.* 1:162. 1791. Not *S. elongatus* R. Br. 1810.*Agrostis compressa* Poir. in *Lam. Encycl. Suppl.* 1:258. 1810. Not *A. compressa* Willd., 1790, nor Poir (op. cit.) 1:259. 1810.*Axonopus poiretii* Roem. & Schult. *Syst. Veg.* 2:318. 1817.*Agrostis tenuissima* Spreng. *Syst. Veg.* 1:258. 1825.*Sporobolus lamarckii* Desv. ex Hamilt. *Prodr. Pl. Ind. Occ.* 4. 1825.*Vilfa exilis* Trin. *Mém. Acad. St. Pétersb. VI. Sci. Nat.* 4<sup>1</sup>:89. 1840.*Vilfa berteriana* Trin. *Mém. Acad. St. Pétersb. VI. Sci. Nat.* 4<sup>1</sup>:100. 1840.*Sporobolus angustus* Buckl. *Proc. Acad. Phila.* 1862:88. 1862.*Vilfa tenacissima* var. *exilis* Fourn. *Mex. Pl.* 2:99. 1886.*Vilfa tenacissima* var. *intermedia* Fourn. *Mex. Pl.* 2:99. 1886.*Vilfa tenacissima* var. *robusta* Fourn. *Mex. Pl.* 2:100. 1886.*Sporobolus littoralis* var. *elongatus* Dur. & Schinz, *Consp. Fl. Afr.* 5:821. 1894.*Sporobolus berterianus* Hitchc. & Chase, *Contr. U. S. Nat. Herb.* 18:370. 1917.

Erect, tufted, glabrous perennial; culms 1–1.5 m. high; leaves mostly crowded toward the base; blades flat, elongate, attenuate, often flexuous toward the ends, mostly 3–5 mm. wide; panicles 20–35 cm. long, plumbeous, dense, the branches appressed, floriferous to the base or nearly so; spikelets 2–2.4 mm. long; glumes obtuse, the first 0.5 mm. long, the second 0.7–1 mm. long.

Open ground and waste places, tropical and subtropical America. Introduced from Asia.

CHIRIQUÍ: El Boquete, *Hitchcock* 8248, 8288; Finca Lérica to Boquete, *Woodson, Allen & Seibert* 1160. COLÓN: Colón, *Hitchcock* 8035.

4. *SPOROBOLUS INDICUS* (L.) R. Br. *Prodr. Fl. Nov. Holl.* 170. 1810.*Agrostis indica* L. *Sp. Pl.* 63. 1753.*Sporobolus jacquemontii* Kunth, *Rév. Gram.* 2:427. *pl.* 127. 1831.

Perennial; culms slender, in large dense clumps about 1 m. high; blades narrow, elongate, attenuate to a fine point, usually flexuous, flat or becoming loosely rolled; panicles 15–30 cm. long, attenuate toward the tip, the slender branches ascending or spreading; spikelets 1.6–1.8 mm. long, short-pedicellate, subsecund on the under side of the branches; glumes subequal, obtuse, 0.3–0.5 mm. long.

Savannas, dry hills, fields and waste places, Mexico and the West Indies to Colombia and Brazil.

CANAL ZONE: Toro Point, *Hitchcock* 8041; Gatún, *Hitchcock* 7979; Barro Colorado Island, *Kenoyer* 129; *Bailey & Bailey* 629; Culebra, *Hitchcock* 7911; *Pittier* 3434, 3439, 4064; Summit, *Standley* 26917, 29687; Pedro Miguel, *Hitchcock* 7954; Corozal, *Bro. Gervais* 161; *Pittier* 6732; Ancón Hill, *Standley* 26316; Balboa, *Hitchcock* 8021. PANAMÁ: Taboga Island, *Hitchcock* 8066; Panamá, *Standley* 27694. COLÓN: Colón, *Rose* 22062; *Piper* 5217, 5225.

5. *SPOROBOLUS VIRGINICUS* (L.) Kunth, *Rév. Gram.* 1:67. 1829.*Agrostis virginica* L. *Sp. Pl.* 63. 1753.*Agrostis littoralis* Lam. *Tabl. Encycl.* 1:161. 1791.*Vilfa littoralis* Beauv. *Ess. Agrost.* 16, 147, 181. 1812.*Vilfa virginica* Beauv. *Ess. Agrost.* 16, 182. 1812.*Crypsis virginica* Nutt. *Gen. Pl.* 1:49. 1818.*Podosaemum virginicum* Link, *Hort. Berol.* 1:85. 1827.*Sporobolus littoralis* Kunth, *Rév. Gram.* 1:68. 1829.



Extensively creeping, tough, wiry perennial with hard scaly rhizomes; culms slender to rather stout, 50–70 cm., or even as much as 1 m., long, with short internodes; sheaths glabrous; blades conspicuously distichous, mostly 8–12 cm. long, 3–5 mm. wide at the base, very firm, becoming loosely rolled or involute, gradually narrowed to a rather fine but firm point; panicles densely spike-like, 6–10 cm. long, 0.5–1 cm. thick, usually partly enclosed in the sheath; spikelets 2.5 mm. long, rarely longer; glumes acute, subequal, the second as long as the spikelet, the first a little shorter.

Salt marshes and sandy seacoasts, southern Florida, and the West Indies to Brazil and Chile.

CANAL ZONE: Toro Point, *Hitchcock* 8037; Fort Sherman, *Standley* 31181; Cristóbal, *Pittier* 4233. COLÓN: Colón, *Hitchcock* 8036.

## 26. ARISTIDA L.

ARISTIDA L. Sp. Pl. 82. 1753.

*Chaetaria* Beauv. Ess. Agrost. 30, pl. 8, f. 5, 6. 1812.

*Ortachne* Nees, in Seem. Bot. Voy. Herald, 225. 1854.

Spikelets 1-flowered, disarticulating above the glumes; glumes usually unequal, 1-nerved, or rarely 3- to 5-nerved, acuminate or awned; lemma indurate at maturity, terete, convolute around the palea, glabrous or scabrous toward the tip with a sharp, entire or minutely bifid, bearded callus; awns 3, the lateral sometimes very short or wanting, sometimes united at the base in a slender twisted column.

Densely tufted annuals or perennials with involute or narrow flat blades and open or contracted, occasionally spike-like panicles.

- a. Lateral awns wanting or very much reduced.
  - b. Plants annual; culms freely branching; panicles narrow, the short branches spikelet-bearing to the base; central awn curved or flexuous, the lateral ones wanting..... 1. *A. JORULLENSIS*
  - bb. Plants perennial; culms simple; panicles open, diffuse, the long branches naked below; central awn straight or arcuate, the lateral ones very much reduced..... 2. *A. TERNIPES*
- aa. Lateral awns well developed, nearly as long as the central one.
  - b. Plants annual; culms very slender, 5–25 cm. high..... 3. *A. CAPILLACEA*
  - bb. Plants perennial; culms stouter.
    - c. Awns twisted below into a slender column.
      - d. Callus minutely bifid; culms 20–40 cm. high..... 4. *A. PLANIFOLIA*
      - dd. Callus entire; culms 50 cm. to more than 1 m. high.
        - e. Panicles dense, interrupted; lemma 3.5–4 mm. long, much shorter than the glumes; awns 10–12 mm. long, loosely coiled below..... 5. *A. RECURVATA*
        - ee. Panicles narrow but loose; lemma 8–12 mm. long, about as long as the glumes; awns 1–2.5 cm. long, divergent, not coiled..... 6. *A. ORIZABENSIS*
    - cc. Awns not twisted; panicles 5–10 cm. long, dense, spike-like..... 7. *A. TINCTA*

1. *ARISTIDA JORULLENSIS* Kunth, Rév. Gram. 1:62. 1829.

*Streptachne pilosa* H.B.K. Nov. Gen. & Sp. 1:124. 1815. Not *Aristida pilosa* Labill., 1824.

*Ortachne pilosa* Nees, in Seem. Bot. Voy. Herald, 225. 1854.

*Aristida manzanilloana* Vasey, Contr. U. S. Nat. Herb. 1:282. 1893.

Erect annual in small tufts; culms 10–45 cm. high, rarely more, slender, freely



branching from all the nodes; blades mostly less than 10 cm. long, 1–2 mm. wide, flat or becoming involute, tapering to a fine point, scabrous on the upper surface and bearing scattered long white hairs; panicles 5–20 cm. long, finally long-exserted, the short, stiff, rather distant, ascending to spreading branches floriferous to the base, bearing scattered long fine hairs; glumes narrow, acuminate, subequal, 5–7 mm. long, glabrous; lemma gradually narrowed into a curved or flexuous awn, the lemma and awn together 15–35 mm. long, the division indistinct, the lateral awns wanting.

Dry savannas, hillsides, fields, and open ground, Mexico to Panama.

CHIRIQUÍ: David, *Hitchcock* 8354. COCLÉ: Aguadulce, *Pittier* 4850. CANAL ZONE: between Fort Clayton and Corozal, *Standley* 29154; between Panamá and Corozal, *Hitchcock* 9202; Ancón Hill, *Standley* 25210; *Killip* 4194. PANAMÁ: Point Chamé, *Hitchcock* 8157; Chorrera, *Hitchcock* 8170; Las Sabanas, *Standley* 25832, 31858; Panamá, *Hitchcock* 8408; *Standley* 26799; *Piper* 5246; Punta Paitilla, *Standley* 26266; Abalaba, *Killip* 4269; Río Tapía, *Hitchcock* 22947; Río Tecúmen, *Standley* 26635, 29396; between Panamá and Chepo, *Dodge*, *Hunter*, *Steyermark* & *Allen* 16695; Chepo, *Pittier* 4642, 4753.

2. *ARISTIDA TERNIPES* Cav. *Icon. Pl.* 5:46. 1799.

*Streptachne scabra* H.B.K. *Nov. Gen. & Sp.* 1:124. *pl.* 40. 1815.

*Streptachne tenuis* H.B.K. *Nov. Gen. & Sp.* 1:124. 1815.

*Aristida scabra* Kunth, *Rév. Gram.* 1:62. 1829.

*Aristida tenuis* Kunth, *Rév. Gram.* 1:62. 1829.

*Muhlenbergia scabra* Trin. & Rupr. *Mém. Acad. St. Pétersb.* VI. *Sci. Nat.* 5<sup>1</sup>:183. 1842.

*Streptachne cubensis* A. Rich. in *Sagra*, *Hist. Cuba* 11:311. 1850.

*Ortachne scabra* Fourn. *Bull. Soc. Bot. France* 27:295. 1880.

*Ortachne tenuis* Fourn. *Bull. Soc. Bot. France* 27:295. 1880.

Perennial; culms in small tufts, erect, 50–150 cm. high; blades flat, elongate, flexuous, involute toward the tip, tapering into a fine point; panicles large, diffuse, drooping, one-third to half the length of culm, the branches relatively stout, scabrous, naked below; spikelets appressed toward the ends of the branches; glumes 8–10 mm. long; lemma 15–18 mm. long, including the flattened and tapering summit, scabrous on the keel, the central awn subterete, straight or arcuate, 10–15 mm. long, the lateral awns usually less than 1 mm. long.

Rocky hills and open, usually dry places, Texas and Arizona to Colombia; Cuba, Bahamas.

CANAL ZONE: Balboa, *Standley* 25269, 26406. PANAMÁ: Panamá, *Hitchcock* 8402; *D. H. Popenoe* 61. Without locality, *Luis Née* (TYPE).

3. *ARISTIDA CAPILLACEA* Lam. *Tabl. Encycl.* 1:156. 1791.

*Aristida elegans* Rudge, *Pl. Guian.* 22. *pl.* 30. 1805.

*Chaetaria capillacea* Beauv. *Ess. Agrost.* 30, 158. *pl.* 8. *f.* 6. 1812.

*Chaetaria capillaris* Nees, *Agrost. Bras.* 388. 1829.

Delicate annual; culms 5–25 cm. high, erect, freely branching; blades 1–5 cm. long, less than 1 mm. wide, scabrous on the margins, often sparsely pilose with long white hairs; panicles 2–8 cm. long, usually tinged with purple, the capillary branches ascending or spreading, more or less flexuous, naked below, not more than 2 cm. long; glumes narrow, acuminate, the first 2–2.5 mm. long, the second 2.5–3



mm. long, sometimes subequal; lemma 2 mm. long, tapering into a slender twisted column 1.5–2 mm. long; awns about 5 mm. long, divergent.

Dry fields and savannas, Mexico to Brazil and Bolivia.

CHIRIQUÍ: San Felix, *Pittier 5194*; Sabana de la Tortuga, *Pittier 3315*; Bajo Boquete, *Killip 4588*. COCLÉ: El Valle de Antón, *Allen 2805*. CANAL ZONE: between Panamá and Corozal, *Hitchcock 9197*. PANAMÁ: Orange River, *Killip 4259*; *Cornman 606*; Panamá, *Standley 27731, 29751*; Río Tapia, *Hitchcock 22946*; *Standley 28188*; Pacora, *Killip 4203*; Río Tecúmen, *Standley 26497*; Chepo, *Hunter & Allen 79*.

4. *ARISTIDA planifolia* Swallen, sp. nov.

Perennis; culmi 20–40 cm. alti, dense caespitosi, erecti, glabri; vaginae glabrae internodiis longiores, breviter auriculatae; ligula 0.1–0.2 mm. longa, minute ciliata; laminae 8–30 cm. longae, 1–3 mm. latae, involutae, infra scabrae, supra dense pubescentes; paniculae 10–15 cm. longae, erectae, densae, ramis brevibus, appressis, ad basin floriferis; glumae acuminatae, aristatae, in carina scabrae, prima 15 mm. longa, secunda 20–25 mm. longa; lemma 6–7 mm. longum, rostro arcte torto 15–25 mm. longo, callo bifido dense pubescente, 1–1.5 mm. longo; aristae rigidae, scabrae, divergentes, 20–40 mm. longae, basi planae.

Perennial; culms 20–40 cm. high, densely tufted, erect, glabrous; sheaths glabrous, longer than the internodes, slightly auriculate; ligule 0.1–0.2 mm. long, very minutely ciliate; blades 8–30 cm. long, 1–3 mm. wide, involute, the lower ones becoming flat and curled at the base of the plant with age, with rather broad thickened scabrous margins, glabrous on the lower surface, densely but minutely pubescent on the upper; panicles 10–15 cm. long, erect, dense, the short branches closely appressed, floriferous to the base; glumes narrow, acuminate, scabrous on the keel, awned, the first 15 mm. long, the second 20–25 mm. long, including the awns; lemma 6–7 mm. long, the slender twisted beak 15–25 mm. long, the densely pubescent bifid callus 1–1.5 mm. long; awns stiff, about equally divergent, 20–40 mm. long, scabrous, somewhat flattened at the base, the central a little longer than the lateral ones.

Closely related to *A. riparia* Trin., but differing primarily in the short panicle and flat blades coiled at the base of the plant.

Savannas, Panama and Colombia.

PANAMÁ: CHIRIQUÍ: Cerro Vaca, alt. 900–1136 m., Dec. 25–28, 1911, *Pittier 4350* (U. S. Nat. Herb., TYPE). COLOMBIA: TOLIMA: *Woronow 7030*.

5. *ARISTIDA RECURVATA* H.B.K. Nov. Gen. & Sp. 1:123. 1815.

*Chaetaria recurvata* Roem. & Schult. Syst. Veg. 2:397. 1817.

*Aristida neesiana* Trin. & Rupr. Mém. Acad. St. Pétersb. VI. Sci. Nat. 5<sup>1</sup>:113. 1842.

*Aristida riedeliana* Trin. & Rupr. Mém. Acad. St. Pétersb. VI. Sci. Nat. 5<sup>1</sup>:114. 1842.

Densely tufted perennial with numerous old blades flattened and coiled at the base of the plants; culms 60–100 cm. high, relatively slender, glabrous, or scabrous below the panicle; sheaths longer than the internodes, glabrous; blades 15–30 cm. long, 1–3 mm. wide, tapering to a long involute point, glabrous beneath, scaberulous above, with thickened scabrous margins; panicles 10–30 cm. long, narrow,



dense, somewhat interrupted, the branches ascending or appressed, rebranching from near the base, the branchlets appressed and dense, giving the panicle a lobed appearance, the lower internodes as much as 3 cm. long, the upper ones gradually shortened; glumes 8–10 mm. long, narrow, acuminate or awn-pointed, the first very scabrous; lemma 3.5–4 mm. long, glabrous, the slender slightly twisted column 2–3 mm. long, the callus blunt, densely pubescent, about 0.4 mm. long; awns 10–12 mm., rarely 15 mm., long, the central slightly longer than the lateral ones, all loosely coiled together at the base, divergent.

Savannas and dry, rocky or grassy slopes, British Honduras; Panama to Colombia and Brazil.

CANAL ZONE: Ancón Hill, Killip 4220; Piper 5267; Standley 26347; between Panamá and Corozal, Hitchcock 9194. PANAMÁ: Hacienda La Joya, Dodge, Hunter, Steyermark & Allen 16893.

6. *ARISTIDA ORIZABENSIS* Fourn. Mex. Pl. 2:78. 1886.

*Aristida pseudospadicea* F. T. Hubb. Proc. Amer. Acad. 49:500. 1913.

Perennial; culms slender, 50 cm. to more than 1 m. high, smaller in depauperate plants, glabrous; blades 10–30 cm. long, 1–3 mm. wide, scabrous on the upper surface, flat at the base, becoming involute-pointed, the older ones at the base of the plant finally flattened and coiled; panicles 15–30 cm. long, the branches distant, the upper ones appressed, the lower ones often spreading, somewhat flexuous, usually less than 8 cm. long; spikelets appressed; glumes 8–10 mm. long, narrow, acuminate, awn-pointed, the second a little longer than the first; lemma 8–12 mm. long with a slender twisted beak about 3 mm. long; awns 1–2.5 cm. long, about equally divergent, the central a little longer than the lateral ones.

Savannas, thickets, and rocky hills, Mexico to Panama.

COCLÉ: Olá, Pittier 5047, 5066; between Paso del Arado and Olá, Pittier 5019.

7. *ARISTIDA TINCTA* Trin. & Rupr. Mém. Acad. St. Pétersb. VI. Sci. Nat. 5<sup>1</sup>:111. 1842. (Separate)

*Chaetaria spadicea* Nees, Agrost. Bras. 385. 1829. Not *Aristida spadicea* H.B.K., 1815. *Aristida breviglumis* Mez, Repert. Sp. Nov. (Fedde) 17:152. 1921.

Wiry, densely tufted, erect perennial; culms 40–75 cm. high; blades usually erect, elongate, flat, 1–3 mm. wide with slender involute tips, scabrous on the upper surface and on the margins, the lower ones sometimes curved or flexuous; panicles 5–10 cm. long, narrow, rather dense, interrupted, usually tinged with purple, the short branches ascending or appressed, floriferous to the base; glumes about equal, 6 mm. long, acuminate, awn-pointed; lemma 5 mm. long, the short blunt callus minutely pubescent, the summit somewhat narrowed, straight; awns slender, spreading, more or less curved or flexuous, the central 15–20 mm. long, the lateral 10–12 mm. long.

Dry hillsides and savannas, Costa Rica to Brazil.

CANAL ZONE: Ancón Hill, Killip 4197. PANAMÁ: Río Azote Caballo, Dodge, Steyermark & Allen 16853.



## 27. ANTHEPHORA Schreb.

ANTHEPHORA Schreb. Besch. Gräs. 2:105. *pl.* 44. 1810.

Spikelets 1-flowered, in groups of 4, the first glumes many-nerved, indurate, thickened and united at the base forming a false pitcher-shaped involucre around the rest of the spikelets, the groups short-pedicellate, falling entire; second glume 5-nerved, narrowed to a blunt tip; lemma ovate-acuminate, 3-nerved, firm but not indurate, the broad flat margins curved around and enclosing the palea.

Weedy annuals, in our species, with flat blades and terminal spike-like racemes.

## 1. ANTHEPHORA HERMAPHRODITA (L.) Kuntze, Rev. Gen. Pl. 2:759. 1891.

*Tripsacum hermaphrodita* L. Syst. Nat. ed. 10. 2:1261. 1759.

*Anthephora elegans* Schreb. Besch. Gräs. 2:105. *pl.* 44. 1810.

*Anthephora villosa* Spreng. Neu. Entd. 3:14. 1822.

*Cenchrus villosus* Spreng. Syst. Veg. 1:301. 1825.

Annual; culms erect or decumbent at the base, branching, rooting at the lower nodes, 15–50 cm. high; sheaths glabrous or papillose-hirsute near the summit; ligule 2–3 mm. long, thin, brownish; blades 5–20 cm. long, 3–8 mm. wide, flat, acuminate, scabrous; racemes 5–10 cm. long, erect; first glumes 5–7 mm. long, broad, acute or acuminate, scabrous.

Open sandy ground and waste places, tropical America.

COLÓN: Palenque, *Pittier* 4125. CANAL ZONE: Frijoles, *Killip* 4304; Gamboa, *Pittier* 3762; Ancón, *Piper* 5234. PANAMÁ: Taboga Island, *Killip* 4146.

## 28. LEPTOCHLOA Beauv.

LEPTOCHLOA Beauv. Ess. Agrost. 71, 166. *pl.* 15. *f.* 1. 1812.

*Diplachne* Beauv. Ess. Agrost. 80. *pl.* 16. *f.* 9. 1812.

*Rabdochloa* Beauv. Ess. Agrost. 84. 1812.

*Leptostachys* G. Meyer, Prim. Fl. Esseq. 73. 1818.

*Oxydenia* Nutt. Gen. Pl. 1:76. 1818.

*Diachroa* Nutt. Trans. Amer. Phil. Soc. II. 5:147. 1837.

*Ipnium* R. A. Phil. Anal. Univ. Chile 36:211. 1870.

Spikelets few- to several-flowered, the upper floret reduced to a small awnless rudiment, sessile or short-pedicellate, crowded or somewhat distant on one side of the slender rachis; glumes 1-nerved, the second usually longer and broader than the first; lemmas 3-nerved, acute, minutely bifid, awnless or rarely short-awned, pubescent or pilose on the margins and sometimes on the internerves.

Annual or perennial grasses with flat blades and numerous slender spikes scattered along the common axis.

a. Plants annual; sheaths sparsely papillose-pilose; lemmas 1–1.5 mm. long. 1. L. FILIFORMIS

aa. Plants perennial; sheaths glabrous or nearly so; lemmas 1.5–2 mm. long. 2. L. VIRGATA

## 1. LEPTOCHLOA FILIFORMIS (Lam.) Beauv. Ess. Agrost. 71, 161, 166. 1812.

*Festuca filiformis* Lam. Tabl. Encycl. 1:191. 1791.

*Eleusine mucronata* Michx. Fl. Bor. Amer. 1:65. 1803.

*Eleusine filiformis* Pers. Syn. Pl. 1:87. 1805.

*Oxydenia attenuata* Nutt. Gen. Pl. 1:76. 1818.



- Leptostachys filiformis* G. Meyer, Prim. Fl. Esseq. 74. 1818.  
*Leptochloa mucronata* Kunth, Rév. Gram. 1:91. 1829.  
*Leptochloa brachiata* Steud. Syn. Pl. Glum. 1:209. 1854.  
*Leptochloa attenuata* Steud. Syn. Pl. Glum. 1:209. 1854.  
*Leptochloa pellucidula* Steud. Syn. Pl. Glum. 1:209. 1854.  
*Leptochloa paniculata* Fourn. Bull. Soc. Bot. France II. 27:296. 1880.  
*Leptochloa mucronata pulchella* Scribn. Bull. Torrey Club 9:147. 1882.  
*Leptochloa pilosa* Scribn. U. S. Dept. Agr. Div. Agrost. Circ. 32:9. 1901.

Annual; culms slender to rather coarse, branching, erect or sometimes geniculate at the lower nodes, 10 cm. to more than 1 m. high; sheaths sparsely papillose-pilose with long hairs, rarely glabrous; ligule membranaceous, 1-2 mm. long; blades 5-30 cm. long, 3-10 mm. wide, flat, lax, glabrous or sparsely papillose-pilose; inflorescence nearly half the length of the culm; spikes several to numerous, racemose on an elongated axis, spreading or reflexed, 2-15 cm. long (usually less than 10 cm.); spikelets 2- to 3-flowered, 1.5-2 mm. long, the upper floret scarcely exceeding the glumes; glumes acuminate, subequal; lemmas 1-1.5 mm. long, obtuse, minutely bilobed, awnless, pubescent on the nerves and sometimes on the internerves.

A weed in cultivated fields and waste ground, southeastern United States to Argentina.

CANAL ZONE: Ancón, Killip 4182; Balboa, Standley 26416. PANAMÁ: Matías Hernández, Pittier 6855, 6903; Panamá, Hitchcock 8406; Taboga Island, Standley 27958; Hitchcock 8081; Pittier 3564.

2. *LEPTOCHLOA VIRGATA* (L.) Beauv. Ess. Agrost. 71, 161, 166. pl. 15, f. 1. 1812.

- Cynosurus virgatus* L. Syst. Nat. ed. 10. 2:876. 1759.  
*Festuca virgata* Lam. Tabl. Encycl. 1:189. 1791.  
*Eleusine virgata* Pers. Syn. Pl. 1:87. 1805.  
*Chloris poaeformis* H.B.K. Nov. Gen. & Sp. 1:169. 1816.  
*Chloris digitaria* H.B.K. Nov. Gen. & Sp. 1:168. 1816.  
*Leptostachys digitaria* G. Meyer, Prim. Fl. Esseq. 74. 1818.  
*Leptostachys virgata* G. Meyer, Prim. Fl. Esseq. 74. 1818.  
*Leptochloa procera* Nees, Syll. Pl. Ratisb. 1:2. 1824.  
*Cynodon virgatus* Raspail, Ann. Sci. Nat. Bot. 5:302. 1825.  
*Leptochloa digitaria* Nees, Agrost. Bras. 433. 1829.  
*Leptochloa procera* var. *major* Brongn. in Duperrey, Bot. Voy. Coquille 2<sup>2</sup>:48. 1830.  
*Leptochloa procera* var. *minor* Brongn. in Duperrey, Bot. Voy. Coquille 2<sup>2</sup>:48. 1830.  
*Leptochloa mutica* Steud. Syn. Pl. Glum. 1:208. 1854.  
*Leptochloa virgata* var. *aristata* Fourn. Mex. Pl. 2:146. 1886.  
*Leptochloa virgata* var. *intermedia* Fourn. Mex. Pl. 2:146. 1886.  
*Leptochloa perennis* Hack. Inf. Est. Centr. Agron. Cuba 1:411. 1906.

Perennial; culms tufted, erect or somewhat decumbent at the base, 30 cm. to more than 1 m. high; sheaths rounded, glabrous or nearly so; ligule 0.2-0.3 mm. long, minutely erose; blades 10-20 cm. long, 4-12 mm. wide, flat, acuminate, the margins scabrous; inflorescence drooping, 10-15 cm. long; spikes somewhat aggregate, slender, drooping, mostly 6-10 cm. long; spikelets 3- to 4-flowered, 2-3 mm. long; glumes similar, acute, the first 1.5 mm. long, the second a little longer; lemmas 1.5-2 mm. long, sparsely pilose on the margins, the tip blunt, often minutely lobed, awnless or rarely awned.



Open ground along streams and ditches, also in brushy places, Texas, Florida, and the West Indies to Argentina.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart* 67, 76; Lincoln Creek, *Carleton* 190. CHIRIQUÍ: David, *Hitchcock* 8356. COLÓN: Palenque, *Pittier* 4136. CANAL ZONE: Toro Point, *Hitchcock* 8039; Fort Sherman, *Standley* 30926; Río Pequení, *Woodson, Allen & Seibert* 1629; Gatuncillo, *Piper* 5273; Frijoles, *Standley* 31486; Barro Colorado Island, *Kenoyer* 131; Gamboa, *Standley* 28529; Culebra, *Hitchcock* 7918; *Pittier* 2081, 3440; Corozal, *Killip* 4250; *Piper* 5263; Ancón, *Killip* 4105; Balboa, *Standley* 25251, 26459. PANAMÁ: Sambú River, *Pittier* 5527; Taboga Island, *Standley* 27959.

### 29. ELEUSINE Gaertn.

ELEUSINE Gaertn. *Fruct. & Sem.* 1:6. *pl. I. f. II.* 1788.

Spikelets few- to several-flowered, compressed, sessile in two rows on one side of a rather broad rachis; rachilla disarticulating above the glumes and between the florets; glumes shorter than the first floret, unequal, the first 1-nerved, the second 3- to 5-nerved, the lateral nerves approximate close to the keel; lemmas acute, 3-nerved, the nerves close together, the uppermost somewhat reduced; seed dark brown, roughened by fine ridges, loosely enclosed in the thin pericarp.

Annual grasses with two to several racemes digitate at the summit of the culms, sometimes with one or two a short distance below.

1. ELEUSINE INDICA (L.) Gaertn. *Fruct. & Sem.* 1:8. 1788.

*Cynosurus indicus* L. *Sp. Pl.* 72. 1753.

*Eleusine gracilis* Salisb. *Prodr. Stirp.* 19. 1796.

*Eleusine domingensis* Sieber ex Schult. *Mant.* 2:323. 1824. Not *E. domingensis* Pers., 1805.

*Cynodon indicus* Raspail, *Ann. Sci. Nat. Bot.* 5:303. 1825.

*Eleusine scabra* Fourn. ex Hemsl. *Biol. Centr. Amer. Bot.* 3:565. 1885, name only; *Fourn. Mex. Pl.* 2:145. 1886.

*Eleusine indica* var. *major* Fourn. *Mex. Pl.* 2:145. 1886.

Culms in tough spreading clumps, somewhat decumbent at the base, 15–70 cm., or rarely as much as 1 m., high, compressed, very smooth; sheaths compressed, sharply keeled, sparsely papillose near the margins toward the summit, otherwise glabrous, the margins hyaline; ligule membranaceous, erose, about 1 mm. long; blades as much as 25 cm. long, 2–8 mm. wide, flat or conduplicate, the tip navicular, glabrous or sparsely pilose on the upper surface, the margins scabrous; spikes 2 to several, 5–10 cm. long, stiffly ascending; spikelets 5 mm. long; lemmas 3 mm. long, broad at the base, rather abruptly narrowed to the subacute apex, sometimes mucronate.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart* 93; *von Wedel* 1526. CHIRIQUÍ: David, *Killip* 4504; El Boquete, *Hitchcock* 8180. COCLÉ: Aguadulce, *Pittier* 4973. COLÓN: Porto Bello, *Pittier* 2479; Colón, *Rose* 22083. CANAL ZONE: Frijoles, *Pittier* 3760; Culebra, *Hitchcock* 7910; *Pittier* 2114; Summit, *Standley* 30078; Ancón, *Bro. Celestine* 78; Balboa, *Standley* 26403. PANAMÁ: Chepo, *Pittier* 4694; Taboga Island, *Hitchcock* 8075.

### 30. DACTYLOCTENIUM Willd.

DACTYLOCTENIUM Willd. *Enum. Pl.* 1029. 1809.



Spikelets 3- to 5-flowered, compressed, sessile and closely imbricate in two rows on one side of the rather narrow flat rachis, the rachis extending beyond the spikelets; rachilla disarticulating above the first glume and between the florets; glumes broad, unequal, 1-nerved, the second mucronate or short-awned below the tip, deciduous; lemmas broad, keeled, 3-nerved, acuminate or short-awned, the lateral nerves indistinct; palea about as long as the lemma; seed subglobose, ridged, enclosed in a thin pericarp.

Annual grasses with flat blades and 2 to several, short, thick, digitate, ascending or spreading spikes, the rachis prolonged beyond the spikelets.

1. *DACTYLOCTENIUM AEGYPTIUM* (L.) Aschers. & Schweinf. Illustr. Fl. Aegypte. Mém. Inst. Égypt. 2:171. 1887.

*Cynosurus aegyptius* L. Sp. Pl. 72. 1753.

*Aegilops saccharinum* Walt. Fl. Carol. 249. 1788.

*Eleusine aegyptiaca* Desf. Fl. Atlant. 1:85. 1798.

*Eleusine pectinata* Moench, Meth. Pl. Suppl. 68. 1802.

*Chloris mucronata* Michx. Fl. Bor. Amer. 1:59. 1803.

*Eleusine aegyptia* Pers. Syn. Pl. 1:87. 1805.

*Dactyloctenium aegyptiacum* Willd. Enum. Pl. 1029. 1809.

*Dactyloctenium mucronatum* Willd. Enum. Pl. 1029. 1809.

*Eleusine mucronata* Stokes, Bot. Mat. Med. 1:150. 1812.

*Rabdochloa mucronata* Beauv. Ess. Agrost. 84, 158, 176. 1812.

*Eleusine cruciata* Ell. Bot. S. C. & Ga. 1:176. 1816.

*Dactyloctenium meridionale* Hamilt. Prodr. Pl. Ind. Occ. 6. 1825.

*Dactyloctenium mucronatum* var. *erectum* Fourn. Mex. Pl. 2:144. 1886.

Culms branching, radiate-spreading, rooting at the nodes, the ascending ends mostly 20–40 cm. long; spikes 2–5, 1–3 cm. long, thick, digitate, the rachis produced beyond the spikelets in a stiff point; spikelets pectinate, crowded, about 3 mm. long; first glume 1.5 mm. long, acute, scabrous on the keel; second glume a little longer than the first with an awn 1–2.5 mm. long; lemmas acute or acuminate, 2.5–3.5 mm. long.

Fields and waste places in tropical and warm temperate regions around the world.

COCLÉ: Aguadulce, *Pittier* 4972. CANAL ZONE: Chagres, *Fendler* 367; Gatún, *Standley* 27264; Bella Vista, *Killip* 4043; Empire, *Pittier* 3717; Culebra, *Hitchcock* 7901; *Pittier* 2598; Corozal, *Pittier* 6729. PANAMÁ: Matías Hernández, *Pittier* 6758; Gorgona Beach, *Woodson*, *Allen* & *Seibert* 1695; Panamá, *Standley* 27688; Chepo, *Pittier* 4461; Taboga Island, *Hitchcock* 8074.

### 31. CYNODON L.

CYNODON L. Rich. ex. Pers. Syn. Pl. 1:85. 1805. (Conserved).

*Capriola* Adans. Fam. Pl. 2:31, 532. 1763.

*Fibichia* Koel. Descr. Gram. 308. 1802.

Spikelets 1-flowered, sessile in two rows on one side of the narrow triangular rachis, the rachilla disarticulating above the glumes, prolonged beyond the spikelet in a naked stipe, sometimes bearing a rudimentary floret; glumes subequal, acuminate, 1-nerved, the first lunate, the second lanceolate; lemma acute, awnless, 3-nerved, pubescent on the nerves; palea narrow, acute, as long as the lemma.



Stoloniferous perennials with short blades and few to several slender digitate spikes.

1. CYNODON DACTYLON (L.) Pers. Syn. Pl. 1:85. 1805.

*Panicum dactylon* L. Sp. Pl. 58. 1753.

*Digitaria dactylon* Scop. Fl. Carn. ed. 2. 1:52. 1772.

*Dactilon officinale* Vill. Hist. Pl. Dauph. 2:69. 1787.

*Paspalum dactylon* Lam. Tabl. Encycl. 1:176. 1791.

*Digitaria littoralis* Salisb. Prodr. Stirp. 19. 1796.

*Milium dactylon* Moench, Meth. Pl. Suppl. 67. 1802.

*Fibichia umbellata* Koel. Descr. Gram. 308. 1802.

*Digitaria stolonifera* Schrad. Fl. Germ. 1:165. 1806.

*Cynodon maritimus* H.B.K. Nov. Gen. & Sp. 1:170. 1816.

*Cynodon tenuis* Trin. in Spreng. Neu. Entd. 2:63. 1821.

*Chloris cynodon* Trin. Gram. Unifl. 229. 1824.

*Digitaria maritima* Spreng. Syst. Veg. 1:272. 1825.

*Cynodon erectus* Presl, Rel. Haenk. 1:290. 1830.

*Capriola dactylon* Kuntze, Rev. Gen. Pl. 2:764. 1891.

*Fibichia dactylon* Beck, Wiss. Mitt. Bosn. Herzeg. 9:436. 1904.

*Cynodon dactylon* var. *maritimus* Hack. in Fries, Arkiv Bot. 8:40. 1909.

*Capriola dactylon maritima* Hitchc. U. S. Dept. Agr. Bull. 772:179. 1920.

Rhizomatous, stoloniferous, widely creeping perennial; culms wiry, compressed, 10–40 cm. high; sheaths usually overlapping, keeled, glabrous or sparsely pilose at the throat; ligule membranaceous, minutely erose, 0.2–0.3 mm. long; blades flat, 2–20 cm. long (usually 5–10 cm.), 2–4 mm. wide, scabrous, especially on the margins, sometimes sparsely pilose; spikes 4–7, slender, arcuate, 2–7 cm. long; spikelets 2–3 mm. long.

A common weed in open ground throughout the warmer regions of the world.

CANAL ZONE: between Mindi and Colón, *Hitchcock* 7947; Victoria Fill, *Allen* 1753; Culebra, *Hitchcock* 7923; Mamei Hill, *Pittier* 3813; Summit, *Standley* 30087; between Corozal and Ancón, *Pittier* 2166; Balboa, *Standley* 27408.

### 32. CTENIUM Panzer

CTENIUM Panzer, Denkschr. Baier. Akad. Wiss. München 4:288. *pl.* 13. 1813.

(Conserved).

*Campulosus* Desv. Nouv. Bull. Soc. Philom. (Paris) 2:189. 1810.

*Monocera* Ell. Bot. S. C. & Ga. 1:176. 1816.

*Monathera* Raf. Amer. Month. Mag. 4:190. 1819.

Spikelets several-flowered, sessile in two rows on one side of a flattened rachis, the rachilla disarticulating above the glumes, the first two florets sterile, the third fertile, the upper ones remote, much smaller, staminate or neuter; first glume short, acute, 1-nerved; second glume acute or subacuminate, 2- to 3-nerved, the nerves approximate, the lateral ones usually with a conspicuous row of glands, the central nerve excurrent from the middle of the back in a stout or rather slender divergent awn; florets bearded on the callus; lemmas acute or acuminate, sometimes minutely toothed, 3-nerved, the margins variously ciliate, awned from the back or from between the teeth, the awn of the second sterile lemma usually much longer



than the others; palea subacute or subobtuse, as long as the lemma, narrow, the nerves sometimes excurrent in short awns.

Erect, tufted perennials with tall slender culms, firm flat narrow blades, and usually solitary, arcuate or flexuous spikes.

1. *CTENIUM CONCISSUM* Swallen, N. Amer. Fl. 17:601. 1939.

Perennial; culms erect, 35-100 cm. high, pubescent below the spike; sheaths longer than the internodes, scaberulous, the lower ones becoming shredded with age; ligule membranaceous, 1 mm. long, truncate; blades as much as 30 cm. long, 2-4 mm. wide, flat or becoming subinvolute, acuminate, scaberulous; spike 5-16 cm. long, arcuate or becoming flexuous, the rachis 1.5 mm. wide, scabrous on the back, pubescent on the margins; first glume acute, 2 mm. long; second glume acuminate, 8-9 mm. long, scabrous, the awn slender, ascending or spreading, 3-5 mm. long, scaberulous; first sterile lemma 3 mm. long, glabrous on the back, the margins long-ciliate almost the entire length, the awn straight, 4 mm. long; second sterile lemma 4.5-5 mm. long, glabrous on the back, the margins long-ciliate on the upper half, the awn 10-15 mm. long, flexuous; fertile lemma 4-5 mm. long, the margins ciliate on the upper half, the cilia about 3 mm. long, the awn straight, 3 mm. long; palea of the fertile floret subobtuse, scabrous on the keels, the nerves sometimes excurrent in short awns; reduced upper floret 3 mm. long, with an awn about 1 mm. long.

Savannas, Coclé and Chiriquí provinces, Panama.

CHIRIQUÍ: Cerro Vaca, *Pittier 4349*. COCLÉ: Picacho de Olá, *Pittier 5065* (TYPE).

33. *GYMNOPOGON* Beauv.

*GYMNOPOGON* Beauv. Ess. Agrost. 41, *pl. 9. f. 3*. 1812.

*Anthopogon* Nutt. Gen. Pl. 1:81. 1818.

*Biatherium* Desv. Opusc. 72. 1831.

*Monochaete* Doell in Mart. Fl. Bras. 2<sup>3</sup>:78. 1878.

*Doellobloa* Kuntze, Rev. Gen. Pl. 2:773. 1891.

Spikelets 1- to 3-flowered, articulated above the glumes, sessile in two rows on one side of the slender rachis, the rachilla prolonged beyond the upper floret, often bearing a very rudimentary floret, this sometimes reduced to awns; glumes narrow, acuminate, 1-nerved, nearly equal, longer than the florets; lemmas narrow, 3-nerved, awned from between the teeth of a minutely bifid apex, or sometimes almost awnless.

Perennial grasses with erect stiff culms, rounded sheaths, firm, flat or loosely rolled, stiffly spreading blades, and few to numerous slender spikes scattered along the upper half or third, or crowded at the summit of the culm.

1. *GYMNOPOGON FASTIGIATUS* Nees, Agrost. Bras. 430. 1829.

*Monochaete fastigiata* Doell in Mart. Fl. Bras. 2<sup>3</sup>:79. 1878.

*Doellobloa fastigiata* Kuntze, Rev. Gen. Pl. 2:773. 1891.



Perennial; culms very slender, erect or spreading, 30–60 cm. high; sheaths usually much shorter than the internodes, glabrous or sparsely pilose at the mouth; ligule ciliate, 0.1 mm. long; blades flat or rolled, firm, stiffly ascending or sometimes spreading, 1–3 cm. long, 1–3 mm. wide, the margins scabrous; spikes 4–8, 2–7 cm. long, slender, ascending, on an axis 1–4 cm. long; spikelets 1-flowered, the rachilla prolonged behind the floret, the rudimentary floret wanting; glumes acuminate, about 3 mm. long; lemma 2 mm. long, the callus glabrous, the margins long-ciliate toward the summit, the awn very slender, about 1 cm. long.

Savannas and open woods, Costa Rica and Panama; also in Brazil.

COCLÉ: Olá, Pittier 5055.

### 34. CHLORIS Swartz

CHLORIS Swartz, Prodr. Veg. Ind. Occ. 25. 1788.

*Eustachys* Desv. Nouv. Bull. Soc. Philom. (Paris) 2:188. 1810.

*Schultesia* Spreng. Pl. Pugill. 2:17. 1815.

*Agrostomia* Cervant. Naturaleza 1:345. 1870.

Spikelets sessile in two rows on one side of the rachis, with one perfect floret, the rachilla articulate above the glumes, prolonged beyond the fertile floret, and bearing a narrow or club-shaped rudiment composed of one or more reduced sterile lemmas; glumes narrow, 1-nerved (rarely 3-nerved), the second a little longer than the first; fertile lemma 3-nerved, awned from the back just below the usually acute tip, the callus more or less bearded on the sides, the keel glabrous or sparsely pilose, the margins usually ciliate, the hairs on the upper part often much longer than the rest.

Annual or perennial, often stoloniferous grasses, with 2 to several digitate, verticillate, or subracemose spikes.

- |  |               |
|--|---------------|
| a. Florets dark brown.....   | 1. C. PETRAEA |
| aa. Florets green or pale, sometimes tinged with purple.   |               |
| b. Plants annual; rudiment broad, truncate, conspicuous.   |               |
| c. Fertile lemma 3–3.5 mm. long, the cilia as much as 4 mm. long;<br>rudiment composed of one reduced floret.....      | 2. C. VIRGATA |
| cc. Fertile lemma not more than 2.5 mm. long, the cilia 1–2 mm.<br>long; rudiment composed of two reduced florets..... | 3. C. INFLATA |
| bb. Plants perennial; rudiment narrow, acute, usually inconspicuous.....   | 4. C. RADIATA |

1. CHLORIS PETRAEA Swartz, Prodr. Veg. Ind. Occ. 25. 1788.

*Agrostis complanata* Ait. Hort. Kew. 1:96. 1789.

*Eustachys petraea* Desv. Nouv. Bull. Soc. Philom. (Paris) 2:189. 1810.

*Schultesia petraea* Spreng. Pl. Pugill. 2:17. 1815.

*Chloris swartzii* C. Muell. Bot. Zeit. 19:341. 1861.

*Chloris septentrionalis* C. Muell. Bot. Zeit. 19:340. 1861.

*Chloris swartziana* Doell in Mart. Fl. Bras. 2<sup>3</sup>:68. 1878.

Perennial; culms erect or sometimes decumbent at the base and rooting at the lower nodes, 30 cm. to more than 1 m. high, conspicuously flattened; sheaths broad, flattened and keeled, crowded at the base in a fan-shaped cluster; ligule very short, minutely ciliate; blades conduplicate at the base, becoming flat toward the obtuse tip, 4–20 cm. (mostly about 10 cm.) long, 4–8 mm. wide, glabrous or densely



pubescent on the upper surface at the very base; spikes 2-7 (usually 4-6), 3-12 cm. (mostly 6-8 cm.) long, digitate, narrowly ascending; spikelets 2 mm. long, horizontally spreading; glumes 1-nerved, scabrous on the keel, the first 1.2 mm. long, acute, crescent-shaped, the second a little longer, broader, obtuse, notched, with an awn 0.5-1 mm. long; fertile floret dark brown, 1.8 mm. long, the callus very short and rounded, the lemma obovate, blunt, pubescent on the keel, sparsely short-hispid on the upper half of the margins, the tip scabrous, the internerves smooth and shining, mucronate; rudiment oblong-truncate, about 1 mm. long, 0.5 mm. wide, the tip scabrous.

Open sandy ground, usually near the coast, southeastern United States, eastern Mexico, and the West Indies to Trinidad and Panama.

COLÓN: between Fató and Playa de Damas, *Pittier* 3944; Palenque, *Pittier* 4133, 4135.  
CANAL ZONE: Toro Point, *Hitchcock* 8040; Fort Sherman, *Standley* 31193; *Piper* 5883.

2. *CHLORIS VIRGATA* Swartz, Fl. Ind. Occ. 203. 1797.

*Chloris pubescens* Lag. Var. *Cienc.* 4:143. 1805.

*Rabdochloa virgata* Beauv. *Ess. Agrost.* 84, 158. 1812.

*Chloris compressa* DC. *Cat. Hort. Monsp.* 94. 1813.

*Chloris elegans* H.B.K. *Nov. Gen. & Sp.* 1:166. *pl.* 49. 1816.

*Chloris alba* Presl, *Rel. Haenk.* 1:289. 1830.

*Chloris alba* var. *aristulata* Torr. *U. S. Rep. Expl. Miss. Pacif.* 4:155. 1857.

*Agrostomia barbata* Cervant. *Naturaleza* 1:346. 1870.

Annual; culms erect, or usually decumbent at the base, sometimes rooting at the lower nodes, 10 cm. to more than 1 m. high; sheaths compressed-keeled, glabrous, mostly longer than the internodes; ligule very short, minutely ciliate; blades flat, 4-25 cm. long, 3-7 mm. wide, scaberulous or nearly smooth on both surfaces, sometimes more or less papillose-pilose on the upper surface near the base, the margins scabrous; spikes 3-15 (usually about 6), 3-9 cm. (usually 5-6 cm.) long, erect or narrowly ascending, flexuous, crowded in a rather dense silvery head; spikelets 3-3.5 mm. long; glumes acuminate, 1-nerved, scabrous on the keel, the first 1.5-2.5 mm. long, the second 2.5-3 mm. long, with an awn about 1 mm. long; fertile floret 3-3.5 mm. long, the callus bearded, the lemma acute, the keel bowed out at the middle, short-ciliate on the margins on the lower part, long-ciliate on the upper third, the hairs as much as 4 mm. long, the awn rather stout, 6-10 mm. long, scabrous; rudiment 2-2.5 mm. long, about 0.7 mm. wide, subacute, the awn 5-7 mm. long.

A weed in fields and waste places, central and southwestern United States, Mexico, and the West Indies; also in South America and the Old World.

CANAL ZONE: Barro Colorado Island, *Kenoyer* 119; Balboa, *Standley* 25623.

3. *CHLORIS INFLATA* Link, *Enum. Pl.* 1:105. 1821.

*Andropogon barbatum* L. *Mant. Pl.* 2:302. 1771.

*Chloris barbata* Swartz, *Fl. Ind. Occ.* 200. 1797.

*Chloris paraguayensis* Steud. *Syn. Pl. Glum.* 1:204. 1854.

Annual; culms erect, or decumbent at the base and rooting at the lower nodes, 15-85 cm. high; sheaths compressed-keeled, glabrous, the margins hyaline; ligule



0.3 mm. long, minutely ciliate; blades flat, 5–10 cm. long (rarely to 25 cm. long), 2–3 mm. wide, glabrous, or sparsely hispid near the base, the margins scabrous; spikes 7–10, 3–8 cm. long, digitate, more or less flexuous, erect or nearly so, forming a rather dense purplish head; spikelets 2.3–2.5 mm. long; glumes 1-nerved,



Fig. 16. *Chloris radiata*



purple, with hyaline margins, sparsely scabrous on the keel, the first acuminate, 1.5–1.7 mm. long, the second abruptly acute, submucronate, 2.2–2.3 mm. long; fertile floret 2.4 mm. long, the callus prominently bearded, the lemma subobtuse, pilose on both sides of the midnerve, the margins conspicuously ciliate on the upper half, the hairs 1–2 mm. long, the awn 6–8 mm. long; rudiment composed of two reduced, club-shaped, spreading florets, 1–1.5 mm. long, the awns mostly 6–8 mm. long.

Waste places, Mexico and the West Indies, and southward to Argentina.

COLÓN: Colón, *Rose 22063*. CANAL ZONE: Gatún, *Standley 27326*; Monte Lirio, *Maxon 6851*; Darién, *Standley 31620*; Gamboa, *Standley 28341*; Empire, *Pittier 3721*; Culebra, *Hitchcock 7924*; *Pittier 2120*; Corozal, *Pittier 2617*; Ancón, *Piper 5255*; Bro. *Celestine 22*. PANAMÁ: Bella Vista, *Standley 25381*.

#### 4. CHLORIS RADIATA (L.) Swartz, Prodr. Veg. Ind. Occ. 26. 1788.

*Agrostis radiata* L. Syst. Nat. ed. 10. 2:873. 1759.

*Cynosurus scoparius* Lam. Encycl. 2:188. 1786.

*Chloris gracilis* Durand, Chlor. Sp. 10. 1808.

*Chloris durandiana* Schult. Mant. 2:341. 1824.

*Chloris glaucescens* Steud. Syn. Pl. Glum. 1:206. 1854.

*Gymnopogon radiata* Parodi, Physis 4:180. 1918.

Perennial; culms erect or decumbent at the base, branching, 15–60 cm. high, distinctly flattened; sheaths compressed-keeled, longer than the internodes, glabrous; blades thin, flat, mostly 4–10 cm. long, or the lower ones sometimes longer, smooth or scabrous, sometimes sparsely pilose; ligule 0.5 mm. long, minutely ciliate; spikes 5–15 (mostly more than 10), 4–8 cm. long, slender, straight or flexuous, subdigitate or in 2 or 3 approximate fascicles, ascending or spreading; spikelets appressed; glumes acuminate, 1-nerved, the first 1–2 mm. long, the second 2–3 mm. long, glabrous, or scabrous on the keel; fertile floret about 2.5–3 mm. long, narrow, the callus bearded, the lemma glabrous on the back, short-ciliate on the upper part of the margins, the awn 5–10 mm. long, scaberulous; rudiment very slender, 1 mm. long, glabrous, the awn 4–6 mm. long, scaberulous.

Roadsides, grassy plains, and waste places, Mexico and the West Indies to Bolivia and Argentina.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart 66*. CHIRIQUÍ: David, *Hitchcock 8380*. CANAL ZONE: Toro Point, *Hitchcock 8053*; Gatún, *Standley 27318*; Frijoles, *Killip 4296*; Barro Colorado Island, *Standley 41125*; Obispo, *Standley 31788*; Gamboa, *Standley 28350*; Culebra, *Hitchcock 7894*; Summit, *Standley 30082*; Balboa, *Standley 25584, 26461*. PANAMÁ: Taboga Island, *Hitchcock 8073*.

### 35. BOUTELOUA Lag.

BOUTELOUA Lag. Var. Cienc. 4:134. 1805.

*Atheropogon* Muhl. ex Willd. Sp. Pl. 4:937. 1806.

*Triathera* Desv. Nouv. Bull. Soc. Philom. (Paris) 2:188. 1810.

*Heterosteca* Desv. Nouv. Bull. Soc. Philom. (Paris) 2:188. 1810.

*Chondrosium* Desv. Nouv. Bull. Soc. Philom. (Paris) 2:188. 1810.

*Polyodon* H.B.K. Nov. Gen. & Sp. 1:174. 1816.

*Triaena* H.B.K. Nov. Gen. & Sp. 1:178. 1816.



*Actinobloa* Willd. ex Roem. & Schult. Syst. Veg. 2:22, 417. 1817.

*Eutriana* Trin. Fund. Agrost. 161. 1820.

*Erucaria* Cervant. Naturaleza 1:347. 1870.

Spikelets few- to several-flowered, with one fertile floret and one or two rudimentary florets above it, the second floret often staminate and sometimes perfect; glumes 1-nerved, the first narrow, the second much broader, twice as long as the first, or both broad, similar and subequal; fertile lemma 3-nerved, glabrous or bearded at the base, glabrous or pilose on the margins and sometimes pilose across the back, the tip variously lobed or dentate, the nerves usually excurrent in short awns; rudiment reduced to 3 awns or glumaceous, lobed or dentate with 3 usually conspicuous awns.

Perennial (in our species), usually tufted grasses with slender culms and few to many short 1-sided spikes, racemose on a short or often elongated axis.

- a. Plants annual; spikes 10-25. Sheaths and blades sparsely to densely papillose-pilose or papillose-hispid or the sheaths rarely glabrous..... 1. B. DISTICHA
- aa. Plants perennial; spikes 4-10.
  - b. Glumes 3-5 mm. long, glabrous or scabrous on the keel; culms widely spreading. Spikes linear, 1-4 cm. long..... 2. B. AMERICANA
  - bb. Glumes 5-9 mm. long, usually hispid on the keel; culms erect or ascending.
    - c. Lemma of the upper floret deeply cleft..... 3. B. REPENS
    - cc. Lemma of the upper floret minutely dentate..... 4. B. FILIFORMIS

1. *BOUTELOUA DISTICHA* (H.B.K.) Benth. Jour. Linn. Soc. Bot. 19:105. 1881.

*Polyodon distichum* H.B.K. Nov. Gen. & Sp. 1:175. 1816.

*Eutriana polyodon* Trin. Gram. Unifl. 242. 1824.

*Atheropogon distichus* Spreng. Syst. Veg. 1:294. 1825.

*Eutriana pilosa* Hook. f. Trans. Linn. Soc. 20:173. 1847.

*Eutriana gracilis* Hook. f. Trans. Linn. Soc. 20:175. 1847.

*Bouteloua pilosa* Benth. ex S. Wats. Proc. Amer. Acad. 18:179. 1883.

*Eutriana mucronata* Areschoug, Svensk Freg. Eugenies Resa, 118. 1910.

Annual; culms slender, branching, usually decumbent-spreading; sheaths glabrous or usually papillose-pilose, especially toward the summit, the collar often densely pubescent; ligule ciliate, about 0.5 mm. long; blades flat, acuminate, 5-20 cm. long, 2-7 mm. wide, scabrous and more or less papillose-pilose; spikes 10-25, 5-8 mm. long, usually spreading, falling entire; glumes acuminate, scabrous, the first 3-5 mm. long, the second 5-8 mm. long; fertile lemma 5-6 mm. long, 3-toothed, the teeth aristate, the central one minutely bifid; rudiment small, usually reduced to an awn scarcely longer than the fertile floret.

Open or brushy places, Guatemala and the West Indies south to Peru; Galapagos Islands.

COCLÉ: Aguadulce, Pittier 4996. CANAL ZONE: Ancón, D. H. Popenoe 28; Hitchcock 22943; Piper 5275; Balboa, Standley 26422. PANAMÁ: Las Sabanas, Standley 25843; Panamá, Standley 26775; Río Tecúmen, Standley 29393; Sabana of Panamá, Pittier 2537; Pacora River, Killip 4215.

2. *BOUTELOUA AMERICANA* (L.) Scribn. Proc. Acad. Phila. 1891:306. 1891.

*Aristida americana* L. Syst. Nat. ed. 10. 2:879. 1759.

*Aristida antillarum* Poir. in Lam. Encycl. Suppl. 1:451. 1810.

*Bouteloua litigiosa* Lag. Gen. & Sp. Nov. 5. 1816.



*Chaetaria antillarum* Beauv. ex Roem. & Schult. Syst. Veg. 2:395. 1817.

*Atheropogon antillarum* Spreng. Syst. Veg. 1:294. 1825.

*Aristida subbiflora* Steud. Syn. Pl. Glum. 1:138. 1854.

*Eutriana antillarum* Steud. Syn. Pl. Glum. 1:217. 1854.

*Bouteloua elatior* Griseb. Fl. Brit. W. Ind. 537. 1864.

*Atheropogon americanus* Fourn. Mex. Pl. 2:139. 1886.

*Aristida adscensionis* var. *americana* Kuntze, Rev. Gen. 3<sup>3</sup>:340. 1898.

Perennial; culms rather slender, branching, decumbent, sometimes prostrate-spreading, 30–60 cm. high; sheaths glabrous, much shorter than the internodes; ligule very short, ciliate; blades 5–20 cm. long, 1–3 mm. wide, the margins scabrous and papillose or papillose-pilose; spikes 4–10, 1–4 cm. long, linear, ascending or spreading; glumes acuminate, the first 3–4 mm. long, the second slightly broader, 4–5 mm. long, glabrous; fertile floret 4–5 mm. long, the lemma acuminate, glabrous, the callus densely hairy on the sides, the central awn terminal, 2–3 mm. long, the lateral ones about 1.5 mm. long; rudiment reduced to 3 scabrous awns, 8–10 mm. long.

Dry rocky hills, open ground and waste places, Honduras and the West Indies to Brazil.

CANAL ZONE: Ancón Hill, Killip 4217. PANAMÁ: Panamá, Hitchcock 8409; Las Sabanas, Standley 25844; Killip 4035; Bella Vista, Standley 25360.

3. *BOUTELOUA REPENS* (H.B.K.) Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 24:26. 1901.

*Dinebra repens* H.B.K. Nov. Gen. & Sp. 1:172. 1816.

(?) *Bouteloua bromoides* Lag. Gen. & Sp. Nov. 5. 1816.

*Atheropogon repens* Roem. & Schult. Syst. Veg. 2:416. 1817.

(?) *Actinochloa bromoides* Roem. & Schult. Syst. Veg. 2:420. 1817.

*Eutriana repens* Trin. Gram. Unifl. 241. 1824.

Perennial; culms 20–50 cm. high, erect or ascending, branching; sheaths glabrous or sparsely papillose-pilose; ligule minutely ciliate, 0.5 mm. long; blades firm, flat, 8–15 cm. long, 2–5 mm. wide, glabrous or scabrous, sometimes more or less papillose or papillose-pilose; spikes 5–10, 1.5–2.5 cm. long, rather close together, appressed or spreading, falling entire; glumes acuminate, subequal, about 7 mm. long, scabrous or hispid on the keel; lemma of fertile floret 8 mm. long, the central awn 2–4 mm. long, the lateral 1.5–2 mm. long; rudiment glabrous, about 6 mm. long, deeply cleft, the awn from between the lobes 8–10 mm. long, the lateral awns much more slender and a little shorter than the central one.

Sandy soil and rocky slopes near the coast, western Mexico to Panama.

COCLÉ: Aguadulce, Pittier 4873. CANAL ZONE: Las Cruces Trail, Standley 29155. PANAMÁ: Panamá, Piper 5276; Las Sabanas, Pittier 6865; Standley 25864.

4. *BOUTELOUA FILIFORMIS* (Fourn.) Griffiths, Contr. U. S. Nat. Herb. 14:413. 1912.

*Atheropogon filiformis* Fourn. Mex. Pl. 2:140. 1886.

Perennial; culms in small dense tufts, simple or branching, erect or decumbent-spreading at the base, 15–50 cm. high, glabrous; sheaths glabrous or sparsely pilose;



blades flat, acuminate, mostly 5–10 cm. long, 1–2 mm. wide, glabrous or sparsely pilose, the margins scabrous, usually more or less papillose-ciliate; ligule ciliate, less than 1 mm. long; spikes 5–10, ascending or spreading, mostly 1–2 cm. long, falling entire, the rachis short-ciliate, densely pubescent at the base; glumes acuminate, subequal or the second a little longer, mostly 5–7 mm. long, glabrous, the keel scabrous to hispid; lemma about 7 mm. long, glabrous or bearded at the base, acuminate, the awns about 1 mm. long, scabrous; upper floret usually staminate, sometimes perfect, glabrous or bearded at the base, the lemma minutely bifid, the central awn thickish, 3–8 mm. long, the lateral ones more slender, a little shorter than the central.

Rocky hills, southwestern United States to Panama.

PANAMÁ: San Carlos, *Allen 1148*.

### 36. AEGOPOGON Humb. & Bonpl.

AEGOPOGON Humb. & Bonpl. ex Willd. Sp. Pl. 4:899. 1806.

Spikelets in groups of 3, the groups pedunculate, spreading, falling entire, arranged alternately on opposite sides of a slender flattened axis, the central spikelet fertile, the lateral ones staminate or neuter; spikelets 2-flowered; glumes equal, 1-nerved, notched at the apex, awned from between the lobes; lemmas 3-nerved, longer than the glumes, the nerves extending into awns.

Slender perennials with short, narrow flat blades and small racemes, the groups of spikelets all turned to one side.

#### 1. AEGOPOGON CENCHROIDES Humb. & Bonpl. ex Willd. Sp. Pl. 4:899. 1806.

Slender, spreading perennial; culms 20–50 cm. long, erect, or the longer ones spreading, freely branching; sheaths glabrous, keeled; ligule hyaline, 1–2 mm. long, obtuse; blades 2–6 cm. long, 1–2 mm. wide, flat, acuminate, scabrous; racemes slender, 2–5 cm. long, usually purple; spikelets about 3 mm. long, the central awn of the first floret about 10 mm. long, the others half as long or less.

Dry rocky savannas and slopes at medium altitudes, Mexico to Bolivia.

CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock 8206, 8218, 8229; Maxon 5358a; Killip 4551; Pittier 3097; Woodson & Schery 426; El Boquete, Hitchcock 8236, 8249; Killip 4514; Davidson 731, 905; Bajo Boquete, Killip 4557.*

### 37. ORYZA L.

ORYZA L. Sp. Pl. 333. 1753.

Spikelets 1-flowered, disarticulating below the glumes, laterally compressed; glumes narrow, much shorter than the lemma (in our species); lemma indurate, rigid, keeled, 3-nerved, awned or sometimes awnless, sparsely to rather densely hispid; palea similar to the lemma but narrower and with no midnerve on the back, the two nerves close to the margins.

Annuals or perennials with flat blades and open or contracted panicles.



- a. Plants annual, cultivated, sometimes escaped..... 1. O. SATIVA  
 aa. Plants perennial, native.  
 b. Spikelets 8-9 mm. long; awns 5-10 cm. long; panicles narrow;  
 blades 7-14 mm. wide..... 2. O. PERENNIS  
 bb. Spikelets 5 mm. long; awns 1-2 cm. long; panicles large and open;  
 blades 1-3.5 cm. wide..... 3. O. LATIFOLIA

1. *ORYZA SATIVA* L. Sp. Pl. 333. 1753.

Annual; culms erect, up to 1 m. high or more; sheaths all longer than the internodes, soft, glabrous, auriculate, the auricles sometimes hispid-ciliate; ligule acuminate, mostly 1-2 cm. long; blades 20-40 cm. long, 1-1.5 cm. wide, acuminate, scabrous; panicles 10-30 cm. long, narrow, dense, becoming top-heavy; spikelets oblong, 7-10 mm. long; glumes narrow, 2-3 mm. long; lemmas hard, ridged by the lateral nerves, more or less hispid, especially on the keel, awnless or awned, the awn variable.

Cultivated throughout tropical and warm temperate regions at low altitudes.

COCLÉ: Penonomé, *Williams 71*. CANAL ZONE: Río Paraíso, *Standley 29904*. PANAMÁ: Pacora, *Killip 4198*; Taboga, *Killip 4150*; Juan Díaz, *Standley 30629*. SAN BLAS: Puerto Obaldía, *Pittier 4367*.

2. *ORYZA PERENNIS* Moench, Meth. Pl. 197. 1797.

Erect slender to coarse perennial; culms 0.5-2 m. high, soft, succulent, glabrous; ligule 5-40 mm. long, acuminate, the short ligules on small plants; blades elongate, 7-14 mm. wide (short and narrower in small plants), scabrous on the margins; panicles 7-20 cm. long, narrow, the branches ascending or appressed; spikelets 8-9 mm. long, oblong; glumes 2-4 mm. long, narrow, acuminate, sometimes erose-dentate, glabrous; lemma sparsely appressed-hispid, hispid-ciliate on the keel, the tip pale or usually purple; palea sparsely hispid-ciliate on the keels with a tuft of short hairs on the tip; awn 5-10 cm. long, slender, very scabrous.

Swamps and wet savannas, often standing in water, Cuba and Hispaniola; Panama to Brazil.

COCLÉ: Aguadulce, *Pittier 4892*.

3. *ORYZA LATIFOLIA* Desv. Jour. de Bot. (Desv.) 1:77. 1813.

*Oryza sativa* var.  $\beta$ . *latifolia* Doell in Mart. Fl. Bras. 2<sup>3</sup>:7. 1871.

Coarse erect perennial; culms 1-2 m. high, succulent, scaberulous; sheaths elongate, longer than the internodes, keeled toward the summit, glabrous, pubescent on the collar, auriculate, the auricles sometimes hispid-ciliate; ligule 3-5 mm. long, hispid; blades mostly 30-50 cm. long, 1-3.5 cm. wide, scabrous and sparsely pubescent on both surfaces, the margins prominently hispid-scabrous; panicles 30-40 cm. long, the branches verticillate, ascending, scabrous, as much as 25 cm. long, naked toward the base; spikelets 5 mm. long, short-pedicellate, oblong, sparsely hispid, the awns 1-2 cm. long or sometimes wanting; glumes narrow, acuminate, 1 mm. long.

Marshes and along rivers and ditches, British Honduras and the West Indies to Brazil.

CANAL ZONE: Fort Randolph, *Standley 28726*; between Mindi and Colón, *Hitchcock 7945*; between France Field, Canal Zone, and Catival, Colón, *Standley 30447*; Gatún,



*Hitchcock* 9176, 9176½; Culebra, *Hitchcock* 7905. PANAMÁ: Matías Hernández, *Pittier* 6791.

## 38. LEERSIA Swartz

LEERSIA Swartz, Prodr. Veg. Ind. Occ. 21. 1788. (Conserved).

*Homalocenchrus* Mieg, Act. Helv. Phys. Math. 4:307. 1760.

*Asprella* Swartz, Prodr. Veg. Ind. Occ. 21. 1788.

*Endodia* Raf. Neogenyt. 4. 1825.

*Aplexia* Raf. Bull. Bot. Seringe 1:220. 1830.

Spikelets 1-flowered, disarticulating below the glumes, laterally compressed; glumes wanting; lemma awnless, chartaceous, oblong, usually 5-nerved, the lateral nerves close to the margins, these and the keel often hispid-ciliate; palea as long as the lemma, 3-nerved, the lateral nerves near the margins, usually hispid-ciliate, the margins firmly held by the margins of the lemma; stamens 1-6.

- a. Panicles 15-40 cm. long, the slender branches spreading, as much as 15 cm. long, spikelet bearing only toward the ends; spikelets 2-2.5 mm. long..... 1. L. GRANDIFLORA  
 aa. Panicles 4-15 cm. long, the branches narrowly ascending, 1-4 cm. long, spikelet bearing nearly to the base; spikelets 3 mm. long..... 2. L. HEXANDRA

1. LEERSIA GRANDIFLORA (Doell) Prodoehl, Bot. Archiv (Mez) 1:219. 1922.

*Oryza monandra* var.  $\beta$ . *grandiflora* Doell in Mart. Fl. Bras. 2<sup>2</sup>:9. 1871.

*Homalocenchrus grandiflorus* Hitchc. Contr. U. S. Nat. Herb. 17:273. 1913.

Perennial; culms relatively slender, erect, 1-2 m. high, glabrous or sparsely hispid below the nodes, the nodes densely retrorsely bearded; sheaths usually longer than the internodes, keeled toward the summit, auriculate, retrorsely papillose-hispid, sometimes sparsely so; ligule 1-2 mm. long, truncate-erose, fused with the auricles of the sheath; blades flat, 15-30 cm. long, 1-1.5 cm., rarely as much as 2 cm., wide, scabrous, sometimes sparsely appressed-hispid; panicles 15-40 cm. long, open, the relatively few distant widely ascending slender branches as much as 15 cm. long, spikelet bearing only toward the ends; spikelets 2-2.5 mm. long, sparsely hispid-scabrous on the nerves, otherwise nearly glabrous; stamens 2.

Shady banks and borders of streams, Mexico to Brazil.

CHIRIQUÍ: El Boquete, *Hitchcock* 8300.

2. LEERSIA HEXANDRA Swartz, Prodr. Veg. Ind. Occ. 21. 1788.

*Asprella hexandra* Beauv. Ess. Agrost. 2, 153. 1812.

*Leersia mexicana* H.B.K. Nov. Gen. & Sp. 1:195. 1816.

*Asprella mexicana* Roem. & Schult. Syst. Veg. 2:267. 1817.

*Leersia contracta* Nees, Agrost. Bras. 516. 1829.

*Oryza hexandra* Doell in Mart. Fl. Bras. 2<sup>2</sup>:10. 1871.

*Oryza mexicana* Doell in Mart. Fl. Bras. 2<sup>2</sup>:10. 1871.

*Leersia gouinii* Fourn. Mex. Pl. 2:2. 1886.

*Homalocenchrus gouinii* Kuntze, Rev. Gen. Pl. 2:777. 1891.

*Homalocenchrus hexandrus* Kuntze, Rev. Gen. Pl. 2:777. 1891.

*Leersia dubia* Areschoug, Svensk Freg. Eugenies Resa, 115. 1910; Repert. Sp. Nov. (Fedde) 10:299. 1912.

Aquatic perennial; culms slender, erect from a decumbent or creeping base,



rooting at the lower nodes, 0.5 to more than 1 m. long, the nodes retrorsely hirsute; sheaths shorter than the internodes, keeled, glabrous, auriculate, the auricles acuminate; ligule 1–3 mm. long, truncate, fused with the auricles; blades 4–20 cm. long, 4–12 mm. wide, scabrous; panicles 4–15 cm. long, narrow, the short branches 1–4 cm. long, narrowly ascending, floriferous nearly to base; spikelets 3 mm. long, hispid, strongly hispid-ciliate on the keels of the lemma and palea; stamens 2.

Swamps, wet ditches, and margins of rivers and lakes, southern United States, and the West Indies to Argentina.

COCLÉ: Aguadulce, *Pittier 4909*. CANAL ZONE: Río Chagres, *Fairchild 2049*; Gatún, *Hitchcock 7967*; Barro Colorado Island, *Kenoyer 127*; Balboa, *Hitchcock 8007*. PANAMÁ: Matías Hernández, *Standley 28985*; Panamá, *Piper 5247*; Chepo, *Pittier 4552*.

### 39. PHARUS L.

PHARUS L. *Syst. Nat.* ed. 10. 2:1269. 1759.

Spikelets unisexual, 1-flowered, in pairs, one pistillate, sessile, the other staminate, long-pedicellate, appressed along the panicle branches; staminate spikelets small; glumes unequal, the first shorter, 1-nerved, the second about as long as the floret, 3-nerved; lemma acute or subacute; stamens 6; pistillate spikelet large, terete; glumes short and acuminate to nearly as long as the floret, 3- to several-nerved; lemma becoming indurate with a minute beak, straight or curved, partly to almost completely covered on the back with uncinata hairs, the margins in-rolled, tightly enclosing the palea; stigmas 3.

Erect or decumbent perennials with broad, thin, petiolate, obliquely nerved, transversely veined blades, and open panicles, the pairs of spikelets appressed along the branches; main axis short or elongate, terminating in a long slender bristle, the branch from the base of this bristle continuing the panicle making it appear unsymmetrical, this branch articulate at the base and readily deciduous.

- |   |                   |
|---|-------------------|
| a. Fruit 2.2–2.7 cm. long, slender and slightly hooked at the tip, 4–5 times as long as the short acuminate glumes..... | 1. P. CORNUTUS    |
| aa. Fruit not more than 15 mm. long, not more than twice as long as the glumes.   |                   |
| b. Fruit S-shaped.....  | 2. P. LONGIFOLIUS |
| bb. Fruit straight or only slightly curved near the summit.   |                   |
| c. Fruit pubescent only near the tip, slender, 15 mm. long, curved near the summit.....                                 | 3. P. LATIFOLIUS  |
| cc. Fruit pubescent nearly to the base, plump, straight or slightly curved.   |                   |
| d. Glumes of pistillate spikelet green, more than half as long as the fruit.....  | 4. P. VIRESCENS   |
| dd. Glumes of pistillate spikelet reddish-brown, not more than half as long as the fruit.                               |                   |
| e. Culms erect; blades 3.5–4 cm. wide; staminate spikelets 3–4 mm. long.....  | 5. P. GLABER      |
| ee. Culms decumbent, rooting at the lower nodes; blades 1.5–3 cm. wide; staminate spikelets 2 mm. long.....             | 6. P. PARVIFOLIUS |

1. PHARUS CORNUTUS Hack. *Oesterr. Bot. Zeitschr.* 52:9. 1902.

Perennial; culms erect, 30–65 cm. high; sheaths scaberulous, longer than the



internodes or the lower ones sometimes shorter than the internodes; ligule 1–2 mm. long, brown, ciliate; blades mostly 8–15 cm. long, 3.5–7 cm. wide, or the lower ones and those on small shoots smaller, obovate, rather abruptly narrowed to an acute or acuminate tip, narrowed to a petiole-like base about 1 cm. long, glabrous or scaberulous, sometimes pubescent near the base; panicle 12–20 cm. long, the branches ascending with usually spreading branchlets, the main axis terminating in a staminate spikelet; staminate spikelets 4 mm. long, pubescent; first glume 1–2 mm. long, 1-nerved, narrow, acuminate; second glume 2–3 mm. long, 5-nerved, much broader than the first, obtuse, apiculate; lemma acute, 5- to 7-nerved, the nerves rather prominent; pistillate spikelet 2.2–2.7 cm. long, short-pedicellate, spreading; glumes narrow, acuminate, pubescent, the first 3.5–4 mm. long, 3-nerved, the second about 5 mm. long, 5-nerved; fruit straight, hooked at the tip, sparsely covered with fine uncinata hairs toward the base, the hairs becoming dense toward the summit.

Wet forests, Costa Rica and Panama.

BOCAS DEL TORO: Chiriquí Lagoon, *von Wedel 2189, 2287*.

2. *PHARUS longifolius* Swallen, sp. nov.

Perennis; culmi erecti, 120 cm. alti, minute pubescentes; vaginae elongatae, scaberulae; laminae 25–35 cm. longae, 5–6.5 cm. latae, oblanceolatae, abrupte acutae vel acuminatae, supra glabrae, infra scabrae; paniculae 40 cm. longae, ramis adscendentibus, remotis, ramulis divaricatis, implicatis; spiculae masculae 3.8–4 mm. longae, pubescentes; spiculae femineae 12–14 mm. longae; glumae angustae, acuminatae, pubescentes, fructu dimidio breviores; fructus curvatus in dimidio superiore dense pubescens, apice glaber.

Perennial; culms erect, 120 cm. high, minutely crisp-pubescent; sheaths mostly of nearly equal length, elongate, scaberulous; body of blade 25–35 cm. long, 5–6.5 cm. wide, oblanceolate, gradually narrowed to a rather long petiole-like base, rather abruptly narrowed near the tip to an acute or acuminate apex, glabrous above, scabrous beneath; panicle long-exserted, the main axis 40 cm. long, the stiffly ascending branches solitary, distant, the branchlets divaricate, implicate; staminate spikelet 3.8–4 mm. long, pubescent, the glumes acute, the first about half, the second two-thirds as long as the lemma; lemma acuminate; pistillate spikelet 12–14 mm. long; glumes about half as long as the fruit, narrow, acuminate, pubescent; fruit slender S-shaped, densely pubescent from below the middle, the pointed tip glabrous.

Wet or moist forests, Panama and Colombia.

PANAMÁ: PANAMÁ: Río Tecúmen, *Standley 26694*; Alhajuela, *Dodge, Steyermark & Allen 16508*; Matías Hernández, in shady woods, Jan. 1–15, 1915, *Pittier 6941* (U. S. Nat. Herb., TYPE). COLOMBIA: Cartagena, *Bro. Heriberto 261*.

Related to *P. mezii* Prodoehl and resembling it in the S-shaped fruits. In that species, however, the culms are only about 40 cm. high with panicles scarcely 15 cm. long, the branchlets not implicate; the staminate spikelets are glabrous, only 2 mm. long, and the glumes of the pistillate spikelet are glabrous or nearly so.



## 3. PHARUS LATIFOLIUS L. Syst. Nat. ed. 10. 2:1269. 1759.

Erect perennial; culms 40-80 cm. high, glabrous; sheaths glabrous, keeled, all longer than the internodes, the lower ones elongate; blades oblanceolate, 10-30 cm. long, mostly 3.5-8.5 cm. wide, narrowed to a petiolate base, the petiole sometimes as much as 10 cm. long, the tip abruptly acuminate; panicles 10-30 cm. long, the branches stiffly ascending or spreading, rarely reflexed, sometimes reduced to a single branch; staminate spikelet 4 mm. long, glabrous or minutely scabrous; glumes obtuse, the first about 1 mm. long, the second 2.5-3.5 mm. long; pistillate spikelets 15 mm. long, subsessile or short-pedicellate, appressed; glumes 8-12 mm. long, acute or subobtuse, the second a little longer than the first; fruit slender, slightly curved at the tip, densely pubescent near the summit for a short distance, otherwise glabrous.

Moist forests, British Honduras and the West Indies to Peru and Brazil.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart* 77; *Carleton* 196; *von Wedel* 1416, 1552, 1736; Changuinola Valley, *Stork* 100. CHIRIQUÍ: San Felix, *Pittier* 5744. COLÓN: Loma de la Gloria, *Pittier* 4088. CANAL ZONE: Frijoles, *Standley* 27430; Barro Colorado Island, *Standley* 31259, 40920; *Kenoyer* 104; *D. H. Popenoe* 39; Juan Mina, *Bartlett & Lasser* 16788; Ancón Hill, *Standley* 25176. PANAMÁ: Juan Díaz, *Standley* 30617; Río Tapia, *Standley* 28092.

4. PHARUS VIRESCENS Doell in Mart. Fl. Bras. 2<sup>2</sup>:1, 21. 1871.

Perennial; culms erect from a usually decumbent base, often rooting at the lower nodes, 50 cm. to more than 1 m. long; sheaths all overlapping, flattened but scarcely keeled, glabrous; blades oblanceolate, gradually narrowed to the base, somewhat abruptly narrowed toward the end to an acuminate apex, scaberulous, 12-35 cm. long, 3-6.5 cm. wide at the widest place; panicles 15-30 cm. long, the branches as much as 23 cm. long, relatively few-flowered; staminate spikelets 3-4 mm. long, the first glume subobtuse, one-third to half, the second acuminate, as long as the spikelet; fertile spikelet 12-15 mm. long, the glumes equal, 8-11 mm. long, lanceolate, 3- to 5-nerved, acute or subacute, green; fruit straight or slightly curved, pubescent across the back at the summit, the pubescence extending down the sides nearly to the base, the lower part of the back and narrow margins glabrous.

Wet forests and scrub, Dominican Republic; Guatemala to Brazil and Peru.

PANAMÁ: Río Tecúmen, *Hunter & Allen* 248.

## 5. PHARUS GLABER H.B.K. Nov. Gen. &amp; Sp. 1:196. 1816.

Perennial; culms erect, 50-75 cm. high, glabrous; sheaths glabrous, smooth and shining; blades broadly lanceolate, mostly 15-18 cm. long, 3.5-4 cm. wide, gradually tapering toward both ends, acute, glabrous, shining; panicles 15-30 cm. long, the branches distant, stiffly ascending; staminate spikelets 3-4 mm. long, glabrous; glumes obtuse, the first one-third, the second about two-thirds as long as the floret; pistillate spikelets 9-12 mm. long; glumes equal, about half as long as the fruit, brown, glabrous; fruit plump, straight, densely pubescent to the base, the pointed glabrous tip about 1 mm. long.



Forests, Mexico and the West Indies to Colombia and Brazil.

CHIRIQUÍ: El Boquete, *Hitchcock 8308*.

6. *PHARUS PARVIFOLIUS* Nash, Bull. Torrey Club 35:301. 1908.

Perennial; culms decumbent at the base, rooting at the lower nodes, mostly 60–100 cm. long; sheaths much overlapping, keeled, glabrous; blades lanceolate, acuminate, glabrous, mostly 15–20 cm. long, 15–30 mm. wide; panicles mostly 15–20 cm. long, the pubescent branches and branchlets stiffly and abruptly ascending to spreading; staminate spikelets 2 mm. long; pistillate spikelets 11–14 mm. long; glumes subequal, acute, about half as long as the fruit; fruit plump, densely pubescent all over except near the base and on the short, pointed tip.

Moist forests, Mexico and the West Indies to Brazil.

CANAL ZONE: Barro Colorado Island, *Bailey & Bailey 546*.

40. *LUZIOLA* Juss.

*LUZIOLA* Juss. ex Gmel. Syst. Nat. ed. 13. 2:637. 1791.

Monoecious, the staminate and pistillate spikelets in separate inflorescences, the staminate usually terminal, the pistillate from the middle and upper nodes; glumes wanting; lemma and palea nearly equal, thin, several- to many-nerved, the nerves more prominent in the pistillate spikelets; stamens several; stigmas long, plumose; caryopsis free, subspherical, smooth or minutely striate.

1. *LUZIOLA subintegra* Swallen, sp. nov.

Perennis natans; vaginae inflatae internodiis longiores, transverse nervosae, glabrae, auriculatae, auriculae 1–8 cm. longae; laminae elongatae, acuminatae, 1–2.5 cm. latae, scabrae et sparse pilosae, marginibus serratis; paniculae masculae 12–15 cm. longae, ramis gracilibus, inferioribus subverticillatis adscendentibus vel patentibus; spiculae 6 mm. longae, glabrae; paniculae femineae 5–6 cm. longae, dense multiramosa, ramis subglabris implicatis apice spiculo; spiculae 4–5 mm. longae, acuminatae, pallidae, forte nervosae; caryopsis subglobosa, minute striata, 2 mm. longa.

Aquatic perennial; culms rather thick, succulent, rooting at the nodes, frequently floating, glabrous; sheaths loose, inflated, transversely veined, usually longer than the internodes, glabrous, auriculate, the auricles 1–8 cm. long, fused with the ligule, attenuate to a fine point; blades elongate, acuminate, 1–2.5 cm. wide, gradually narrowed to the thickened base, scabrous and sparsely pilose on both surfaces, the margins hispid-scabrous, almost serrate; staminate panicles 12–15 cm. long, the slender branches ascending to spreading, sparsely pilose, rather densely villous in the axils, the lowest ones subverticillate; spikelets 6 mm. long, the lemma and palea thin, glabrous; pistillate inflorescences partly enclosed, protruding sidewise from the inflated sheaths, 5–6 cm. long, about as broad; branches numerous, at first stiffly ascending, finally spreading or reflexed, implicate, glabrous, terminating in a spikelet, the peduncle flat, weak, easily drooping, the panicle



turned downward in the water; spikelets at time of flowering 4–5 mm. long, narrow, acuminate, pale, the lemma and palea thin, but not readily disintegrating, prominently nerved, bulged out at maturity exposing the fruit; caryopsis 2 mm. long, subspherical, minutely striate.

CANAL ZONE: floating in Chagres River at Juan Mina, June 25–Aug. 29, 1940, *Bartlett & Lasser 16816* (TYPE).

Similar in habit to *L. spruceana* Benth. but differing in the characters of the pistillate inflorescences. In *L. spruceana* the branches of the pistillate panicles are very scabrous, not terminating in a spikelet, and the lemma and palea are fragile, readily disintegrating between the nerves leaving the caryopsis subtended by bristles. The nerves of the lemma and palea are also more scabrous than in *L. subintegra*.

#### 41. ARUNDINELLA Raddi

ARUNDINELLA Raddi, *Agrost. Bras. 36. pl. 1. f. 3.* 1823.

Spikelets short-pedicelled in rather dense contracted panicles; glumes acuminate, the first 3- to 5-nerved, the second 5-nerved, much longer than the first; sterile lemma acute, 3- to 5-nerved, a little shorter to a little longer than the first glume, containing a well-developed palea; fertile floret much shorter than the sterile lemma, with a short bearded callus and a terminal geniculate awn.

Slender to coarse perennials with narrow blades and small to large contracted panicles.

- a. Awns 2–5 mm. long, tightly twisted below the bend.
- b. Spikelets 3 mm. long; awns 2 mm. long, the twisted segment about as long as the sterile lemma..... 1. *A. HISPIDA*
- bb. Spikelets 4.5–5 mm. long; awns about 5 mm. long, the twisted segment about 2 mm. long, distinctly longer than the sterile lemma.... 2. *A. CONFINIS*
- aa. Awns 8–12 mm. long, not twisted, or only slightly so toward maturity.
- b. Culms coarse, 1–2.5 m. high; sheaths densely papillose-hispid..... 3. *A. DEPPEANA*
- bb. Culms slender, 30–60 cm. high; sheaths glabrous..... 4. *A. BERTERONIANA*

1. ARUNDINELLA HISPIDA (Humb. & Bonpl.) Kuntze, *Rev. Gen. Pl.* 2:761. 1891.

*Andropogon hispidus* Humb. & Bonpl. ex Willd. *Sp. Pl.* 4:908. 1806.

*Ischaemum hispidum* H.B.K. *Nov. Gen. & Sp.* 194. 1816.

*Arundinella brasiliensis* Raddi, *Agrost. Bras.* 37. 1823.

Erect perennial; culms 1–1.7 m. high, more slender than *A. deppeana*, glabrous, the nodes densely appressed-pubescent; sheaths mostly shorter than the internodes, papillose-hispid toward the summit or sometimes only papillose; ligule about 0.5 mm. long; blades firm, usually elongate, 5–12 mm. wide, densely hispid, or papillose only; panicles 10–30 cm. long, erect, dense, greenish-purple, the branches narrowly ascending; spikelets 3 mm. long; first glume shorter than or about as long as the sterile floret, the second a little longer, bluntly acuminate; awn of fertile floret about 2 mm. long, tightly twisted below, the twisted part about equaling the sterile floret, the terminal part stiffly spreading.

Wet meadows and grassy hillsides, Panama to Argentina.

CHIRIQUÍ: El Boquete, *Hitchcock 8183, 8320, 8321*; Bajo Boquete, *Killip 8183*.



2. *ARUNDINELLA CONFINIS* (Schult.) Hitchc. & Chase, Contr. U. S. Nat. Herb., 18:290. 1917.

*Piptatherum confine* Schult. Mant. 2:184. 1824.

*Arundinella martinicensis* Trin. Gram. Pan. 62. 1826.

*Arundinella pallida* Nees, Agrost. Bras. 465. 1829.

Similar in size and habit to *A. hispida*; sheaths papillose only, or glabrate; spikelets 4.5–5 mm. long, the awn of the fertile floret commonly 5 mm. long, the lower twisted portion about 2 mm. long, distinctly longer than the sterile lemma.

Grassy slopes, southern Mexico and the West Indies to Paraguay.

CHIRIQUÍ: El Boquete, Killip 4521. CANAL ZONE: Red Tank to Pueblo Nuevo, Piper 5220.

3. *ARUNDINELLA DEPPEANA* Nees in Steud. Syn. Pl. Glum. 1:115. 1854.

*Arundinella phragmitoides* Griseb. Cat. Pl. Cuba, 234. 1866.

Coarse perennial; culms erect, 1–2.5 m. high, glabrous; sheaths all much longer than the internodes, rather firm but loose, densely papillose-hispid with appressed hairs, especially toward the summit; ligule membranaceous, about 0.5 mm. long, blades elongate, attenuate, flat, scabrous and sparsely to densely papillose-hispid; panicles 25–70 cm. long, dense, somewhat interrupted below, the slender straight or commonly flexuous branches in dense closely overlapping fascicles, some naked at the base, the lower ones 10–15 cm., or rarely as much as 25 cm. long; spikelets 4–5 mm. long, appressed; glumes acuminate, the first 3-nerved, the second much longer than the first, 5-nerved; sterile lemma acute; awn of fertile floret about 1 cm. long, geniculate, not twisted, slender and flexuous above the bend.

Dry savannas, thickets and hillsides, Mexico and the West Indies to Brazil.

CHIRIQUÍ: El Boquete, Hitchcock 8307; Killip 4508; Davidson 802. COCLÉ: La Venta Beach, Muenscher 12210. CANAL ZONE: Empire to Mandinga, Piper 5254; East Paraíso, Standley 30038; Pedro Miguel, Killip 4310; Victoria Fill, Allen 1714; between Panamá and Corozal, Hitchcock 9199; between Fort Clayton and Corozal, Standley 29024; Balboa Heights, Greenman & Greenman 5051. PANAMÁ: Pacora, Killip 4242; Río Tecúmen, north of Chepo road, Hunter & Allen 241.

4. *ARUNDINELLA BERTERONIANA* (Schult.) Hitchc. & Chase, Contr. U. S. Nat. Herb. 18:290. 1917.

*Trichochloa berteroniana* Schult. Mant. 2:209. 1824.

*Muhlenbergia berteroniana* Kunth, Rév. Gram. 1:64. 1829.

*Arundinella peruviana* Steud. Syn. Pl. Glum. 1:115. 1854.

*Arundinella cubensis* Griseb. Mem. Amer. Acad. (n. s.) 8:533. 1862.

Slender perennial; culms densely tufted, erect, 30–60 cm., or sometimes as much as 1 m. high, glabrous, the nodes appressed-pubescent; sheaths glabrous, sparsely hispid in the throat and on the collar, the margins glabrous or ciliate; ligule ciliate, very short; blades commonly 10–20 cm. long, 2–5 mm. wide, flat or sometimes involute, papillose or papillose-hispid; panicles 10–30 cm. long, rather lax, the ascending branches not densely-flowered, floriferous to the base; spikelets 4–5 mm. long, the slender awn of the fertile floret 8–12 mm. long, not twisted below, geniculate, the terminal portion spreading or reflexed.



Rocky river banks, Mexico and the West Indies to Brazil.

BOCAS DEL TORO: *Carleton* 216. COCLÉ: Río Mata Ahogado, *Allen* 128, 140. PANAMÁ: Juan Díaz River, *Killip* 4261; Quebrada La Palma, *Dodge & Allen* 17361; Quebrada Peluca, *Steyermark & Allen* 17251; Río Chilibre, *Piper* 5272.

#### 42. LEPTOCORYPHIUM Nees

LEPTOCORYPHIUM Nees, *Agrost. Bras.* 83. 1829.

Spikelets lanceolate, paniculate; first glume wanting, second glume and sterile lemma subequal, longer than the fruit, the glume 3-nerved, the lemma 5-nerved, both covered with white silky hairs; fruit reddish-brown with a thin hyaline tip, scarcely indurate, the margins of the lemma not inrolled, the palea free at the summit.

Densely tufted perennials with long narrow blades and small, narrow, somewhat silky panicles.

1. LEPTOCORYPHIUM LANATUM (H.B.K.) Nees, *Agrost. Bras.* 84. 1829.

*Paspalum lanatum* H.B.K. *Nov. Gen. & Sp.* 1:94. *pl.* 29. 1815.

*Milium lanatum* Roem. & Schult. *Syst. Veg.* 2:322. 1817.

*Anthaenantia lanata* Benth. *Jour. Linn. Soc. Bot.* 19:39. 1881.

Perennial; culms 50–100 cm. high in small dense tufts; leaves somewhat crowded toward the base, the blades elongate, flat or folded, sometimes involute, 2–4 mm. wide, scabrous; panicles 6–17 cm. long, narrow but loose, the branches narrowly ascending or rarely spreading; spikelets 4 mm. long, densely pilose with pale, silky, appressed or spreading hairs.

Open grassy savannas and hillsides, Mexico and the West Indies to Argentina.

CANAL ZONE: Ancón Hill, *Killip* 4343.

#### 43. TRICHACHNE Nees

TRICHACHNE Nees, *Agrost. Bras.* 85. 1829.

*Valota* Adans. *Fam. Pl.* 2:495. 1763.

Spikelets lanceolate, rather distant, in pairs in two rows on one side of a narrow rachis; first glume small, hyaline, nerveless, glabrous; second glume and sterile lemma nearly equal, longer than the fruit, 3- to 5-nerved, densely covered with usually long silky, pale or tawny hairs; fruit cartilaginous, acuminate, dark brown at maturity, the tip pale, the margins of the lemma broad, thin, hyaline, nearly covering the palea, not inrolled.

Slender to rather coarse perennials with flat narrow blades and plume-like (in our species) contracted inflorescences of numerous slender racemes scattered on an elongate common axis.

1. TRICHACHNE INSULARIS (L.) Nees, *Agrost. Bras.* 86. 1829.

*Andropogon insularis* L. *Syst. Nat.* ed. 10. 2:1304. 1759.

*Panicum lanatum* Rottb. *Act. Lit. Univ. Hafn.* 1:269. 1778.



- Milium villosum* Swartz, Prodr. Veg. Ind. Occ. 24. 1788.  
*Milium hirsutum* Beauv. Ess. Agrost. 13. pl. 5. f. 5. 1812.  
*Panicum leucophaeum* H.B.K. Nov. Gen. & Sp. 1:97. 1815.  
*Panicum insulare* G. Meyer, Prim. Fl. Esseq. 60. 1818.  
*Saccharum polystachyum* Sieb. ex Kunth, Enum. Pl. 1:124. 1833.  
*Panicum saccharoides* A. Rich. in Sagra, Hist. Cuba 11:306. 1850. Not *P. saccharoides* Trin., 1826.  
*Panicum falsum* Steud. Syn. Pl. Glum. 1:67. 1854.  
*Panicum duchaissingii* Steud. Syn. Pl. Glum. 1:93. 1854.  
*Tricholaena saccharoides* Griseb. Abhandl. Gesell. Wiss. Göttingen 7:265. 1857.  
*Tricholaena insularis* Griseb. Abhandl. Gesell. Wiss. Göttingen 7:265. 1857.  
*Digitaria leucophaea* Stapf in Thiselt.-Dyer, Fl. Cap. 7:382. 1898.  
*Panicum insulare* var. *leucophaeum* Kuntze, Rev. Gen. Pl. 3<sup>3</sup>:361, 362. 1898.  
*Syntherisma insularis* Millsp. & Chase, Field Mus. Bot. 1:473. 1902.  
*Valota insularis* Chase, Proc. Biol. Soc. Washington 19:188. 1906.  
*Digitaria insularis* Mez ex Ekman, Arkiv Bot. 13<sup>10</sup>:22. 1913.  
*Andropogon fabricii* Herzog ex Henr. Med. Rijks Herb. Leiden 40:44. 1921.

Perennial; culms erect or decumbent-spreading at the base, from a knotty rhizomatous base, branching, mostly 1–1.5 m. high, usually many-noded, the internodes relatively short; cataphylls densely and softly hairy; sheaths keeled toward the summit, longer than the internodes, sparsely papillose-pilose or papillose-hirsute, the lower ones often densely so, with a tuft of hairs in the throat; ligule thin, 3–4 mm. long; blades 10–30 cm. long, 2–12 mm. wide, flat, acuminate to attenuate-pointed, finely scabrous on the margins; panicles 15–30 cm. long, narrow, dense, tawny, silky, the branches narrowly ascending, spikelet-bearing from the base; spikelets 3.5–4 mm. long, obscured by the long silky hairs, the first glume about 0.5 mm. long, glabrous.

Open ground and waste places, Texas to Florida, Mexico and the West Indies to Argentina. Common in Panama.

CANAL ZONE: Fort Sherman, Maxon & Valentine 7021; Frijoles, Piper 5243; Culebra, Hitchcock 7896; Pittier 2087; Summit, Standley 30125; Ancón, Bro. Celestine 24; Balboa, Standley 26106. PANAMÁ: Point Chamé, Hitchcock 8156, 8158; Taboga Island, Hitchcock 8097.

#### 44. DIGITARIA Heist.

DIGITARIA Heist. ex Scop. Fl. Carn. ed. 2. 1:52. 1772.

*Syntherisma* Walt. Fl. Carol. 76. 1788.

Spikelets solitary, in pairs, or in groups of 3–5, alternate in two rows on one side of a 3-angled, winged or wingless rachis, the first glume turned away from the rachis; first glume wanting, or present as a smaller or minute nerveless scale; second glume from much shorter to as long as the spikelet; sterile lemma as long as or slightly longer than the fruit, 5-nerved, the lateral nerves sometimes approximate near the margin; fruit cartilaginous, pale or dark brown, the hyaline margins of the lemma not inrolled.

Annuals or perennials with usually flat blades and slender racemes, digitate or approximate on the common axis.



- a. Plants annual; culms decumbent-spreading, or if erect, freely branching at the base.
- b. Culms widely spreading, usually rooting at the lower nodes.
  - c. First glume present, small, nerveless; rachis narrowly winged; second glume distinctly shorter than the fruit.
  - d. Spikelets 3 mm. long, the sterile lemma usually conspicuously villous on the margins; rachis 1 mm. wide, without scattered long white hairs..... 1. *D. SANGUINALIS*
  - dd. Spikelets 2 mm. long, the sterile lemma subglabrous or inconspicuously pilose; rachis about 0.4 mm. wide with a few scattered long white hairs..... 2. *D. HORIZONTALIS*
  - cc. First glume wanting; rachis wingless; second glume and sterile lemma equal, longer than the fruit..... 3. *D. LANUGINOSA*
- bb. Culms erect in small tufts.
  - c. Racemes 10.5–13 cm. long, curved; sheaths papillose or papillose-hirsute; spikelets with no tufts of hairs at the tip..... 4. *D. HIRSUTA*
  - cc. Racemes 1–5 cm. long, stiffly ascending; sheaths pubescent or villous; spikelets with a dense tuft of yellowish hairs at the tip... 5. *D. ARGILLACEA*
- aa. Plants perennial; culms erect, simple; racemes appressed or narrowly ascending.
  - b. Second glume nearly as long as the fruit; racemes 1–3, 2.5–7 cm. long; sheaths pilose or hirsute..... 6. *D. SINGULARIS*
  - bb. Second glume about one-fourth as long as the fruit, obtuse, sometimes shallowly lobed, glabrous; racemes 4–5, about 15 cm. long, brownish from the exposed fruits; sheaths glabrous..... 7. *D. CURTIGLUMA*

1. *DIGITARIA SANGUINALIS* (L.) Scop. Fl. Carn. ed. 2. 1:52. 1772.

*Panicum sanguinale* L. Sp. Pl. 57. 1753.

*Dactylon sanguinalis* L. ex Vill. Hist. Pl. Dauph. 2:69. 1787.

*Syntherisma praecox* Walt. Fl. Carol. 76. 1788.

*Paspalum sanguinale* Lam. Tabl. Encycl. 1:176. 1791.

*Digitaria praecox* Willd. Enum. Pl. 91. 1809.

*Panicum adscendens* H.B.K. Nov. Gen. & Sp. 1:97. 1815.

*Cynodon praecox* Roem. & Schult. Syst. Veg. 2:412. 1817.

*Digitaria marginata* Link, Enum. Pl. 1:102. 1821.

*Digitaria fimbriata* Link, Hort. Berol. 1:226. 1827.

*Panicum fimbriatum* Kunth, Rév. Gram. 1:33. 1829.

*Panicum linkianum* Kunth, Rév. Gram. 1:33. 1829.

*Syntherisma sanguinalis* Dulac, Fl. Haut. Pyr. 77. 1867.

*Syntherisma fimbriatum* Nash, Bull. Torrey Club 25:302. 1898.

*Syntherisma marginatum* Nash, N. Amer. Fl. 17:154. 1912.

*Digitaria marginata* var. *fimbriata* Stapf in Prain, Fl. Trop. Afr. 9:440. 1919.

*Panicum sanguinale* subsp. *marginatum* Thell. Vierteljahrs. Nat. Ges. Zürich 64:699. 1919.

*Digitaria sanguinalis* var. *marginata* Fernald, Rhodora 22:103. 1920.

*Digitaria adscendens* Henr. Blumea 1:92. 1934.

*Digitaria nealleyi* Henr. Blumea 1:94. 1934.

Decumbent or geniculate-spreading annual; culms geniculate and commonly rooting at the lower nodes, ascending, 15 cm. to more than 1 m. long; sheaths shorter than the internodes, sparsely to rather densely papillose-hirsute; ligule membranaceous, truncate, 1–2 mm. long; blades 2–10 cm. long, or sometimes longer in robust specimens, 2–9 mm. wide, scabrous, sparsely to rather densely pilose or papillose-pilose with prominent white midnerve and margins; racemes 2–several, digitate or with a second whorl a short distance below, the rachis about 1 mm. wide, narrowly winged; spikelets 3 mm. long, the first glume small but plainly evident; second glume acuminate, about three-fourths as long as the fruit;



sterile lemma slightly longer than the fruit, from nearly glabrous to prominently villous on the margins.

A common weed in cultivated ground and waste places, in warm temperate and tropical regions around the world.

CHIRIQUÍ: El Boquete, *Hitchcock* 8233, 8314. CANAL ZONE: between Mindi and Colón, *Hitchcock* 7941; Frijoles, *Pittier* 3761; Gamboa, *Pittier* 4440; *Standley* 28504; Culebra, *Hitchcock* 7915; *Pittier* 2650; Summit, *Standley* 30092; Corozal, *Piper* 5262; between Corozal and Ancón, *Pittier* 2185; Ancón, *Piper* 5235; Bro. Celestine 23; Balboa, *Standley* 25493; *McBride* & *Featherstone* 42; Balboa Heights, *Killip* 4255. PANAMÁ: Matías Hernández, *Pittier* 6853; Panamá, *Hitchcock* 22948; Chepo, *Pittier* 4464.

## 2. DIGITARIA HORIZONTALIS Willd. Enum. Pl. 92. 1809.

*Phalaris velutinus* Forsk. Fl. Aegypt. Arab. 17. 1775. Not *Digitaria velutina* Hitchc. 1927. *Milium digitatum* Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Not *Digitaria digitata* Buse, 1854.

*Axonopus digitatus* Beauv. Ess. Agrost. 12, 154. 1812.

*Panicum horizontale* G. Meyer, Prim. Fl. Esseq. 54. 1818.

*Digitaria setosa* Desv. ex Hamilt. Prodr. Pl. Ind. Occ. 6. 1825.

*Digitaria jamaicensis* Spreng. Syst. Veg. 1:272. 1825.

*Paspalum digitatum* Kunth, Rév. Gram. 1:24. 1829.

*Panicum hamiltonii* Kunth, Rév. Gram. 1: Suppl. IX. 1830.

*Syntherisma setosa* Nash, Bull. Torrey Club 25:300. 1898.

*Panicum sanguinale* var. *digitatum* Hack. ex Urban, Symb. Antill. 4:86. 1903.

*Panicum sanguinale* subsp. *horizontale* Hack. Ergeb. Bot. Exped. Akad. Wiss. Südbras. 8. 1906; Denkschr. Akad. Wiss. Math. Naturw. (Wien) 79:69. 1908.

*Syntherisma digitata* Hitchc. Contr. U. S. Nat. Herb. 12:142. 1908.

*Digitaria digitata* Urban, Symb. Antill. 8:24. 1920. Not *D. digitata* Buse, 1854.

Similar in habit, size, and pubescence to *D. sanguinalis*, the blades usually more densely pilose; racemes slender, approximate on a short axis rather than digitate, the rachis 0.4 mm. wide, very narrowly winged, with a few scattered, spreading, long white hairs; spikelets 2 mm. long; first glume minute or wanting; second glume about half as long as the fruit, sparsely villous at the tip; sterile lemma subglabrous or sparsely pilose or villous on the margins, the hairs short.

A common weed in cultivated ground and waste places in tropical and subtropical regions. More frequent than *D. sanguinalis* in the Tropics.

BOCAS DEL TORO: Isla Colón, *von Wedel* 1359. CANAL ZONE: Toro Point, *Hitchcock* 8058; Monte Lirio, *Maxon* 6844; Obispo, *Standley* 31776; Las Cascadas Plantation, *Standley* 29548; Empire to Mandinga, *Piper* 5239; Culebra, *Hitchcock* 7916; Summit, *Standley* 30124. PANAMÁ: Juan Díaz, *Standley* 30620; Pacora, *Killip* 4240; Chepo, *Pittier* 4693; Point Chamé, *Hitchcock* 8163; Taboga Island, *Hitchcock* 8078; *Standley* 27954.

## 3. DIGITARIA LANUGINOSA (Nees) Henr. Med. Rijks Herb. Leiden 61:5. 1930.

*Paspalum lanuginosum* Nees, Agrost. Bras. 63. 1829.

*Panicum cuyabense* Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 1:206. 1834.

*Digitaria cuiabense* Parodi, Physis 8:378. 1926.

Straggling annual, resembling *Digitaria horizontalis*; culms as much as 1.5 m. long; sheaths villous, or the upper ones glabrous; blades flat, lax, 5–20 cm. long, 2–5 mm. wide, softly pubescent; racemes 2–6, 5–14 cm. long, ascending, racemose on a short axis; rachis angular, scabrous, wingless; spikelets paired, 3 mm. long,



one pedicel about 1 mm. long, the other about 3 mm. long; first glume wanting; second glume and sterile lemma equal, acuminate, pointed beyond the fruit, sparsely pubescent on the margins.

Along ditches and in brushy places, Panama to Bolivia and Argentina.

CHIRIQUÍ: El Boquete, *Hitchcock* 8245, 8262.

4. *DIGITARIA hirsuta* Swallen, sp. nov.

Annual; culmi erecti, ca. 50 cm. alti. glabri; vaginae internodiis longiores, dense papilloso-pilosae; ligula truncata, ca. 1 mm. longa; laminae 6–20 cm. longae, 3–4 mm. latae, planae, acuminatae, dense hirsutae; racemi 3–5, 10.5–13 cm. longi, racemosi, anguste adscendentes, rachi 0.4 mm. lata, sparse pilosa; spiculae 1.8 mm. longae; gluma prima obsoleta; gluma secunda angusta, fructu  $2/3$ – $3/4$  brevior; lemma sterile fructu vix longius, acutum, 5-nerve, marginibus pubescentibus; fructus 1.7 mm. longus, ellipticus, subacutus, fuscus.

Annual; culms erect, about 50 cm. high, glabrous; sheaths all longer than the internodes, rounded or keeled toward the summit, densely papillose-pilose; ligule truncate, about 1 mm. long; blades 6–20 cm. long, 3–4 mm. wide, flat, acuminate, densely hirsute; racemes 3–5, 10.5–13 cm. long, racemose on a short pilose axis, densely villous in the axils, narrowly ascending, somewhat curved, the rachis 0.4 mm. wide, wingless, sparsely pilose with long pale hairs, the angles very scabrous; spikelets in groups of 2 to 5, the scabrous pedicels of varying length, one or two very short, the rest successively longer, some as much as 4 mm. long; spikelets 1.8 mm. long; first glume obsolete; second glume narrow, two-thirds to three-fourths as long as the fruit; sterile lemma slightly longer than the fruit, elliptic, acute, 5-nerved, the nerves rather prominent, pubescent on the margins, otherwise glabrous or nearly so; fruit 1.7 mm. long, narrowly elliptic, acutish, chestnut-brown.

Open sandy ground and brushy slopes, Panama.

CANAL ZONE: Balboa, *Standley* 26444. This specimen has shorter racemes than the type, 2–5 cm. long. PANAMÁ: Point Chamé, sandy field, Sept. 18, 1911, *Hitchcock* 8159 (U. S. Nat. Herb., TYPE).

5. *DIGITARIA ARGILLACEA* (Hitchc. & Chase) Fernald, *Rhodora* 22:104. 1920.

*Syntherisma argillacea* Hitchc. & Chase, *Contr. U. S. Nat. Herb.* 18:296. 1917.

Annual; culms 5–35 cm. high, in small dense tufts, erect or somewhat geniculate at the base, rather freely branching from the lower nodes; leaves almost all crowded toward the base; sheaths keeled at least toward the summit, short but longer than the short internodes, or the uppermost elongate; ligule truncate, less than 1 mm. long; blades 2–5 cm. long, 2–3.5 mm. wide, flat, acuminate, sparsely to rather densely pilose or hirsute; racemes 1–4, 1–5 cm. long, stiffly ascending, racemose on a short axis, the rachis wingless; spikelets 2 mm. long, in pairs, one sessile, the other pedicellate; first glume obsolete; second glume and sterile lemma nearly equal, about as long as the fruit, villous with golden hairs which extend in a tuft beyond the tip of the spikelet.



Savannas, rocky or brushy slopes, and waste places, Mexico to Panama; West Indies.

COCLÉ: Aguadulce, *Pittier 4859*. PANAMÁ: Panamá, *Hitchcock 8404*.

6. *DIGITARIA SINGULARIS* Mez, Bot. Jahrb. (Engler) 56: Beibl. 125:8. 1921.

Slender erect perennial; culms 30–60 cm. high, glabrous, or the nodes sometimes pubescent; sheaths pilose or hirsute with spreading hairs, usually elongate, longer or shorter than the internodes; ligule brown, truncate, about 1 mm. long; blades elongate, 2–3 mm. wide, glabrous or with a few scattered hairs; racemes 1–3, long-exserted, 2.5–7 cm. long, appressed; rachis very narrowly winged; spikelets 2 mm. long, acute, paired or three together, the pedicels rounded, scabrous; first glume obsolete; second glume and sterile lemma glandular-pubescent, the glume a little shorter, the lemma slightly longer than the chestnut or blackish-brown fruits.

Savannas, Panama; Paraguay.

CANAL ZONE: between Panamá and Corozal, *Hitchcock 9196*. PANAMÁ: Chorrera, *Hitchcock 8149*.

7. *DIGITARIA CURTIGLUMA* Hitchc. Proc. Biol. Soc. Washington 40:84. 1927.

Perennial; culms in large dense clumps, slender, especially toward the base, 1–1.5 m. high; sheaths usually shorter than the internodes, glabrous; ligule very short; blades linear, as much as 40 cm. long, 4–7 mm. wide, flat, glabrous, or sparsely pilose on the upper surface near the base; racemes 4–5, 12–15 cm. long, appressed or very narrowly ascending, the rachis narrowly winged, about 0.7 mm. wide, scabrous; spikelets 2.3 mm. long, paired, one short-pedicellate, the other with a pedicel as long as or somewhat longer than the spikelet; first glume wanting or present as a very short thin scale; second glume about one-fourth as long as the fruit, obtuse, sometimes shallowly lobed, glabrous; sterile lemma elliptic, acute, 5-nerved, the lateral nerves approximate near the margins, minutely pubescent on the internerves; fruit dark reddish-brown, striate.

Open cut-over hillsides, Panama.

CHIRIQUÍ: El Boquete, *Hitchcock 8176* (TYPE).

45. *STENOTAPHRUM* Trin.

*STENOTAPHRUM* Trin. Fund. Agrost. 175. 1820.

Spikelets sessile or subsessile, solitary in two rows on one side of a flattened rachis, the racemes reduced to 1–3 spikelets, the rachis produced beyond the upper spikelet, the prolongation about as long as the spikelet, the short racemes inbedded (in our species) on one side of a thickened corky axis; first glume about one-fourth as long as the spikelet; second glume and sterile lemma equal, pointed beyond the fruit, acuminate, 5-nerved, the lemma enclosing a palea or staminate flower; fruit acute, chartaceous, the margins of the lemma thin, not inrolled.

Coarse, wiry, branching, stoloniferous perennial with flat obtuse blades, and solitary terminal and axillary, thickened false racemes.



## 1. STENOTAPHRUM SECUNDATUM (Walt.) Kuntze, Rev. Gen. Pl. 2:794. 1891.

*Ischaemum secundatum* Walt. Fl. Carol. 249. 1788.*Rottboellia stolonifera* Poir. in Lam. Encycl. 6:310. 1804.*Stenotaphrum americanum* Schrank, Pl. Rar. Hort. Monac. pl. 98. 1822.*Stenotaphrum sarmentosum* Nees, Agrost. Bras. 93. 1829.*Diastemantha platystachys* Steud. Syn. Pl. Glum. 1:360. 1854.*Stenotaphrum glabrum* var. *americanum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:300. 1877.*Stenotaphrum dimidiatum* var. *americanum* Hack. in Stuck. Anal. Mus. Nac. Buenos Aires 21:57. 1911.*Stenotaphrum dimidiatum* var. *secundum* [*secundatum*] Domin, Bibl. Bot. 85:332. 1915.*Stenotaphrum secundatum* var. *variegatum* Hitchc. in Bailey, Stand. Cycl. Hort. 6:3237. 1917.

Coarse tough wiry stoloniferous perennial; culms compressed, erect from the usually arching stolons, 5–50 cm. high, long internodes alternate with a series of very short ones, making the leaves in groups; sheaths broad, compressed, keeled, glabrous, sometimes ciliate on the margins, with a small tuft of hairs in the throat; blades flat, conduplicate, obtuse, 2–15 cm. long, as much as 15 mm. wide unfolded, glabrous, the margins scabrous at the tip; racemes terminal on the main culm and short branches from the upper nodes, mostly 4–10 cm. long, straight or curved, the thick rachis 3–4 mm. wide; spikelets 4–6 mm. long, acuminate, glabrous, the first glume obtuse, one-third to half as long as the spikelet.

Sea-shores and sandy ground, southern United States and the West Indies to Argentina; Africa, Hawaii, Pacific Islands, and Australia.

BOCAS DEL TORO: Laguna de Chiriquí, Hart 183. COLÓN: Viento Frio, Pittier 4115; Río Indio de Fató, Pittier. CANAL ZONE: Chagres, Fendler 362.

## 46. THRASYA H.B.K.

THRASYA H.B.K. Nov. Gen. &amp; Sp. 1:120. pl. 39. 1815.

Spikelets in pairs in two rows on one side of a narrow- to broad-winged rachis, turned back to back, the first sessile, the second pedicellate, the pedicel adnate to the rachis, the spikelets thus appearing solitary; first glume small, sometimes hyaline; second glume usually shorter than the fruit, acute; sterile lemma indurate, sulcate and often splitting down the middle at maturity, enclosing a well-developed palea and usually a staminate flower; fruit indurate, striate, with a few stiff hairs at the tip, the margins narrow, firm, not inrolled.

Branching perennials with narrow flat blades and solitary, terminal and axillary, straight or usually curved racemes.

- |   |                    |
|---|--------------------|
| a. Rachis broadly winged, 3–4 mm. wide; culms rather coarse, 1–1.5 m. high; spikelets 4 mm. long.....   | 1. T. PETROSA      |
| aa. Rachis 1–2 mm. wide; culms not more than 90 cm. high, usually less; spikelets 2.2–3.5 mm. long.   |                    |
| b. Racemes 8–20 cm. long; rachis 1.5–2 mm. wide; culms 70–90 cm. high.  |                    |
| c. Spikelets 3.5 mm. long, the second glume and sterile lemma sparsely pilose on the margins; rachis 2 mm. wide; blades pubescent on both surfaces..... | 2. T. HITCHCOCKII  |
| cc. Spikelets 2.8 mm. long, glabrous; rachis 1.5 mm. wide; blades glabrous or scabrous, prominently papillose-hispid-ciliate.....                       | 3. T. CILIATIFOLIA |



bb. Racemes 2–5 cm. long; rachis 0.5–1 mm. wide; culms not more than 50 cm. high.

c. Sheaths and blades glabrous or more or less papillose-hirsute; spikelets 2.2 mm. long, glabrous..... 4. *T. GRACILIS*

cc. Sheaths and blades densely and softly villous; spikelets 2.5 mm. long, densely villous..... 5. *T. VILLOSA*

1. *THRASYA PETROSA* (Trin.) Chase, Proc. Biol. Soc. Washington 24:115. 1911.

*Panicum petrosum* Trin. Gram. Icon. 3: pl. 280. 1831.

*Tylothrasya petrosa* Doell in Mart. Fl. Bras. 2<sup>2</sup>:295. pl. 37. 1877.

Perennial; culms tufted, erect, 1–1.5 m. high, appressed papillose-pilose, the nodes bearded; sheaths keeled, elongate, mostly longer than the internodes, glabrous to densely papillose-pilose, especially toward the summit; ligule brown, truncate, about 1 mm. long; blades elongate, mostly 4–6 mm. wide, acuminate or sometimes attenuate, narrowed toward the base, glabrous to more or less papillose or papillose-hirsute, the uppermost wanting or very much reduced; racemes 15–20 cm. long, curved, on long slender peduncles, the rachis winged, 3–4 mm. wide; spikelets 4 mm. long, villous; first glume minute; second glume longer than the fruit, acuminate; sterile lemma slightly shorter than the second glume, acute, sulcate, slightly divided at the summit, the palea prominent, nearly as long as the lemma; fertile lemma 3.5 mm. long, narrowly ovate, pale, minutely striate, subacute.

Dry grassy hills and savannas at lower altitudes, Guatemala; Panama to Peru, Brazil, and Paraguay.

CHIRIQUÍ: Dolega, *Hitchcock* 8344. CANAL ZONE: between Panamá and Corozal, *Hitchcock* 9193; Ancón Hill, *Killip* 4122. PANAMÁ: Chorrera, *Hitchcock* 8140½; Taboga Island, *Hitchcock* 8092.

2. *THRASYA HITCHCOCKII* Chase, Jour. Washington Acad. Sci. 17:142. 1927.

Perennial; culms tufted, erect or ascending, about 70 cm. high, flattened, sparsely to densely papillose-pilose, the lower nodes appressed-pubescent; sheaths keeled, papillose-hirsute to nearly glabrous, the margins densely ciliate; ligule brown, truncate, about 1 mm. long; blades 15–30 cm. long, 5–6 mm. wide, the uppermost reduced or obsolete, pubescent on both surfaces and also sparsely hirsute with longer hairs, the margins rather prominently hispid-ciliate; racemes terminal and axillary, 10–20 cm. long, arcuate, long-exserted, the rachis 2 mm. wide, glabrous, with a few long hairs on the margins; spikelets 3.5 mm. long, oblong-elliptic; first glume minute or obsolete, occasionally acuminate, as much as 2 mm. long; second glume and sterile lemma equal, exceeding the fruit, the glume evidently 5-nerved, pilose on the margins, the lemma indurate, subacute, glabrous or with a few hairs on the margins; fruit 3 mm. long, pale, striate-roughened, with a few stiff hairs at the summit of the lemma.

Wood borders, Panama and Venezuela.

PANAMÁ: Chorrera, *Hitchcock* 8140 (TYPE).

3. *THRASYA ciliatifolia* Swallen, sp. nov.

Perennis; culmi 80–90 cm. alti, erecti, pauciramosi, glabri, nodiis inferioribus pubescentibus; vaginae elongatae, glabrae vel sparse papilloso-hirsutae, marginibus



ciliatis; ligula 1 mm. longa; laminae 15–20 cm. longae, 3–5 mm. latae, marginibus hispido-ciliatis; racemi 8–13 cm. longi, arcuati, rachi sparse ciliata; spiculae 2.8 mm. longae, glabrae; gluma prima 1.5 mm. longa, acuminata; gluma secunda abrupte acuta; lemma sterile saepe induratum lemmate fertili vix longius; fructus oblongus, subacutus, striatus.

Perennial; culms 80–90 cm. high, erect, sparingly branching, glabrous, the lower nodes appressed-pubescent; sheaths elongate, keeled toward the summit, glabrous or sparsely papillose-hirsute, the margins ciliate; ligule brown, about 1 mm. long; blades 15–20 cm. long, 3–5 mm. wide, the margins scabrous and prominently papillose-hispid-ciliate, the uppermost blade very much reduced (about 1 cm. long), sometimes wanting; raceme 8–13 cm. long, arcuate, short- or long-exserted, the rachis 1.5 mm. wide, ciliate with long hairs, the hairs sometimes rather sparse; spikelets 2.8 mm. long, glabrous; first glume 1.5 mm. long, acuminate, sometimes short and blunt; second glume nearly as long as the fruit, abruptly acute; sterile lemma usually indurate, acute, often sulcate, slightly longer than the fruit; fruit oblong, subacute, minutely striate-roughened.

Savannas, Panama.

CANAL ZONE: abundant on prairie between Pedro Miguel and Corozal, 20–50 m. alt., Hitchcock 7988½ (U. S. Nat. Herb., TYPE).

4. *THRASYA gracilis* Swallen, sp. nov.

Perennis; culmi 15–50 cm. alti, graciles, erecti, glabri, nodiis inferioribus aliquando pubescentibus; vaginae angustae, glabrae, marginibus ciliatis, suprema elongata; ligula tenuis, 1–2 mm. longa; laminae 6–10 cm. longae, 2–3 mm. latae, glabrae, marginibus papilloso-hispido-ciliatis; racemi 2–3.5 cm. longi, rachi alata, ca. 1 mm. lata; spiculae 2.2 mm. longae, glabrae; gluma prima acuta, ca. 1 mm. longa; gluma secunda abrupte acuta, 1.7 mm. longa, fructu angustior; lemma sterile fructum subaequans; fructus obovatus, acutus, pallens.

Perennial; culms 15–50 cm. high, very slender, erect, glabrous, the lower nodes sometimes pubescent; sheaths narrow, glabrous, ciliate on the margins, the lower ones short but longer than the internodes, the upper one elongate; ligule thin, brownish, 1–2 mm. long; blades 6–10 cm. long, 2–3 mm. wide, the uppermost much reduced, glabrous or more or less papillose-hirsute, the margins prominently papillose-hispid-ciliate; raceme 2–3.5 cm. long, exserted on a long very slender peduncle, the rachis winged, about 1 mm. wide; spikelets 2.2 mm. long, glabrous; first glume acute, about 1 mm. long, the second abruptly acute, 1.7 mm. long, narrower than the fruit; sterile lemma equal to or very slightly longer than the fruit, acute; fruit slightly obovate, acute, pale.

Savannas, Panama.

CHIRIQUÍ: Cerro Vaca, in savannas 900–1130 m. alt., Pittier 5365 (U. S. Nat. Herb., TYPE).

5. *THRASYA villosa* Hitchc. Proc. Biol. Soc. Washington 40:84. 1927.

Perennial; culms erect, freely branching, 10–30 cm. high, densely villous;



sheaths villous; ligule obtuse, less than 1 mm. long; blades 5–10 cm. long, 2–4 mm. wide, flat, villous or velvety-pubescent; racemes terminal and axillary, 2–5 cm. long, slightly curved, the peduncles rather stout, densely villous, the rachis less than 0.5 mm. wide, villous with long and short hairs intermixed; spikelets about 2.5 mm. long, densely pubescent; first glume minute or obsolete; second glume narrower than the fruit and somewhat shorter; sterile lemma as long as the fruit, concave between the lateral nerves; fertile lemma whitish, appressed-hirsute, acutish.

Savannas, Panama.

CHIRIQUÍ: Cerro Vaca, *Pittier 5363* (TYPE).

#### 47. PSEUDECHINOLAENA Stapf

PSEUDECHINOLAENA Stapf in Prain, Fl. Trop. Afr. 9:494. 1919.

Spikelets solitary, sometimes an abortive spikelet below it, pedicellate, rather distant, in two rows on one side of a slender raceme; first glume a little shorter than the spikelet, acute or mucronate, 3- to 5-nerved; second glume a little longer than the first, acuminate, saccate, 5-nerved, at maturity covered with stiff hooked bristles; sterile lemma about as long as the second glume, somewhat indurate, broad, obtuse, with thin margins, glabrous; fruit narrow, subacuminate, smooth and shining, the margins rather broad, not inrolled.

Slender decumbent-spreading annuals with short, broad, flat blades, and short slender racemes distant on the common axis.

##### 1. PSEUDECHINOLAENA POLYSTACHYA (H.B.K.) Stapf in Prain, Fl. Trop. Afr. 9:495. 1919.

*Echinolaena polystachya* H.B.K. Nov. Gen. & Sp. 1:119. 1815.

*Panicum uncinatum* Raddi, Agrost. Bras. 41. 1823.

Slender decumbent-spreading annual; culms 15 cm. to as much as 1 m. high, branching, rooting at the lower nodes, more or less pilose; sheaths mostly much shorter than the internodes, rather densely papillose-pilose or hirsute, especially toward the summit; ligule brown, about 1 mm. long; blades ovate-lanceolate, often unsymmetrical, 2–7 cm. long, 5–16 mm. wide, thin, acuminate-pointed, appressed-pilose on both surfaces; inflorescence 5–20 cm. long, the axis pilose, the slender distant racemes usually narrowly ascending; spikelets 3–4 mm. long, appressed or somewhat spreading, the pedicels 1–3 mm. long; first glume broad, acute, pubescent, a little shorter than the spikelet; second glume longer than the first, sparsely to densely covered with coarse hooked bristles; fruit about 2 mm. long, acute, smooth and shining.

Wet forests, moist brushy slopes, stream margins, and open cultivated ground, Mexico to Bolivia and Paraguay; tropical Africa.

CHIRIQUÍ: El Boquete, *Hitchcock 8179, 8301; Maxon 5006; Finca Lérida to Boquete, Woodson, Allen & Seibert 1167.*



## 48. MESOSETUM Steud.

MESOSETUM Steud. Syn. Pl. Glum. 1:118. 1854.

Spikelets sessile or very shortly pedicellate, in two rows on one side of the flattened rachis, the first glume turned toward, hence the back of the fruit turned away from the rachis; first glume more than two-thirds as long as the spikelet, 3- to 5-nerved; second glume and sterile lemma equal, exceeding the fruit; fertile lemma acute, minutely striate or roughened, the margins flat, but tightly enclosing the palea.

Annual grasses (in our species) with flat narrow blades and solitary, thick, erect racemes.

## 1. MESOSETUM PITTIERI Hitchc. Proc. Biol. Soc. Washington 40:85. 1927.



Fig. 19. *Mesosetum pittieri*

Annual; culms spreading, 10–30 cm. long; nodes hispidulous; blades flat, distantly setulose on the thickened margin, sparingly pilose near the base, 2–5 cm. long, 3–4 mm. wide; raceme 2–4 cm. long; spikelets about 5 mm. long; first glume a little shorter than the equal second glume and sterile lemma, laterally compressed, narrowed to the middle and then widened to a rounded crest-like tip, pilose on the lower part of the keel; second glume laterally compressed above, narrowed to a crest-like acute tip, pilose at the base, sparingly villous on the

lower half of the back, 5-nerved, cross-ridged toward the apex; sterile lemma similar to the second glume, the crested tip less acute; fertile lemma acute, shorter than the second glume.

Savannas at low altitudes, Panama.

COCLÉ: Natá, Allen 839. PANAMÁ: Chepo, Pittier 4516, 4687, 4751 (TYPE).

## 49. ERIOCHLOA H.B.K.

ERIOCHLOA H.B.K. Nov. Gen. & Sp. 1:94. 1815.

Spikelets usually in pairs, arranged in two rows on one side of a slender rachis, the back of the fruit turned away from the rachis; first glume united with the thickened first segment of the rachilla, forming a ring-like callus below the second glume; second glume and sterile lemma equal or nearly so, acute or acuminate, 3-nerved; fruit much shorter than the second glume and sterile lemma (in our species), elliptic, awnless or short-awned, minutely striate and cross-wrinkled or



papillose-roughened, the margins of the lemma firm, inrolled, rather tightly enclosing the palea.

Annuals or perennials with flat blades and terminal inflorescences composed of 2 to many one-sided racemes racemose on a common axis.

- a. Racemes 1 or 2, 1-2 cm. long, densely villous; fruit 2.4 mm. long, awnless..... 1. *E. DISTACHYA*  
 aa. Racemes many, the lower ones usually 4-5 cm. long, not villous, appressed; fruit 2 mm. long, with a hispidulous awn about 1 mm. long..... 2. *E. PUNCTATA*

1. *ERIOCHLOA DISTACHYA* H.B.K. Nov. Gen. & Sp. 1:95. *pl.* 30. 1815.

Low freely branching perennial; culms 10-40 cm. high, slender, erect or geniculate-ascending, densely pubescent below the inflorescence, the nodes bearded, otherwise glabrous; sheaths glabrous or sparsely pilose, with a small tuft of hairs in the throat; ligule densely ciliate, less than 0.5 mm. long; blades 3-15 cm. long, 2-5 mm. wide, flat, acuminate, erect, glabrous, or sparsely pilose on the upper surface, the margins finely scabrous; inflorescence long-exserted, composed of 1 or 2 divergent distant, short racemes; racemes 1-2 cm. long, straight or somewhat curved, densely villous; spikelets 3 mm. long, pectinate, the pedicels with long hairs at the summit; second glume and sterile lemma bluntly acute, densely villous with appressed hairs; fruit 2.4 mm. long, oblong, blunt, pale, awnless, with a few long hairs at the tip.

Savannas at low altitudes, Guatemala to Paraguay.

COCLÉ: Olá, *Pittier 5043*. PANAMÁ: between Las Sabanas and Matías Hernández, *Standley 31861*; Río Tecúmen, *Standley 26613, 29398*; Río Chico, *Killip 4228*.

Known as "cepillito montañoso" in Panama.

2. *ERIOCHLOA PUNCTATA* (L.) Desv. ex Hamilt. Prodr. Pl. Ind. Occ. 5. 1825.

*Milium punctatum* L. Syst. Nat. ed. 10. 2:872. 1759.

*Agrostis punctata* Lam. Encycl. 1:58. 1783.

*Oedipachne punctata* Link, Hort. Berol. 1:51. 1827.

*Helopus punctatus* Nees, Agrost. Bras. 16. 1829.

*Monachne punctata* Nash, Bull. Torrey Club 30:374. 1903.

Glabrous, rather freely branching perennial; culms erect or ascending from a decumbent base, commonly more than 1 m. high, densely pilose below the inflorescence; sheaths rounded, usually much shorter than the internodes, the prophylla, in those subtending the branches, often elongate and conspicuous; ligule densely ciliate, about 0.5 mm. long; blades 15-40 cm. long, 5-15 mm. wide, acuminate, the margins finely scabrous; inflorescence 10-20 cm. long, the axis and the rachis of the narrowly ascending racemes densely pubescent and also pilose; racemes many, ascending or appressed, the lower ones 4-5 cm. long; spikelets 4 mm. long; second glume and sterile lemma equal, acuminate, densely pilose on the lower part with long appressed white hairs, the upper portion glabrous; fruit about 2 mm. long, the hispidulous awn about 1 mm. long.

Swamps, ditches, and wet places, southern United States and the West Indies to Argentina.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart 64*.



## 50. BRACHIARIA Griseb.

BRACHIARIA Griseb. in Ledeb. Fl. Ross. 4:469. 1853.

Spikelets solitary, subsessile in two rows on one side of a flattened or triangular rachis, the first glume turned toward the rachis; first glume 3- to 5-nerved, broad and clasping, one-third to half as long as the spikelet; second glume and sterile lemma equal, longer than the fruit, 5- to 7-nerved, glabrous or pubescent; fruit indurate, usually papillose-rugose, sometimes smooth, the margins of the lemma inrolled.

Annual or perennial, stoloniferous or decumbent-spreading grasses with flat blades and few to several racemes approximate or rather distant on a common axis.

1. BRACHIARIA PLANTAGINEA (Link) Hitchc. Contr. U. S. Nat. Herb. 12:212. 1909.

*Panicum plantagineum* Link, Hort, Berol. 1:206. 1827.

*Panicum leandri* Trin. Gram. Icon. 3: pl. 335. 1836.

*Panicum distans* Salzm. ex Steud. Syn. Pl. Glum. 1:61. 1854. Not *P. distans* Trin., 1829.

*Panicum disciferum* Fourn. Mex. Pl. 2:19. 1886.

Annual; culms decumbent-spreading, rooting at the nodes, the ascending ends and flowering branches commonly 20–30 cm. high; sheaths compressed, keeled, glabrous, usually ciliate on the margins; ligule ciliate, about 1 mm. long; blades 5–20 cm. long, 8–12 mm. wide, rather lax, rounded at the base, the margins scabrous, sparsely ciliate near the base; racemes usually 3–6, or sometimes 1 or 2 on the branches, 3–10 cm. long, rather distant, ascending to spreading, the rachis 1–1.5 mm. wide; spikelets 4–4.7 mm. long, acute, glabrous; fruit 3–3.5 mm. long, plano-convex, subobtuse, minutely striate and papillose-roughened.

Moist open ground, Mexico to Bolivia and Brazil. Introduced in the United States.

PANAMÁ: La Jagua, Bartlett & Lasser 16985.

## 51. AXONOPUS Beauv.

AXONOPUS Beauv. Ess. Agrost. 12, 154. 1812.

Spikelets solitary, sessile in two rows on one side of the 3-angled rachis, the back of the fruit turned from the rachis; first glume wanting; second glume and sterile lemma equal, often pointed beyond the fruit; fertile lemma and palea indurate, the lemma oblong-elliptic, the margins slightly inrolled.

Cespitose or stoloniferous perennials, or rarely annuals, with flat or folded, rounded or pointed blades, and few to many slender racemes, digitate or racemose on the common axis.

a. Rachis conspicuously hispid with stiffly spreading golden-yellow hairs.

b. Rachis winged, 1–2 mm. wide, extended beyond the spikelets, these sunken in hollows of the rachis.

c. Plants perennial; sheaths papillose-hispid; inflorescences terminal on the main culm and branches.....

2. A. CHRYSOBLEPHARIS

cc. Plants annual; sheaths glabrous; inflorescences terminal and axillary.....

3. A. APPENDICULATUS



- bb. Rachis wingless, 0.4–0.7 mm. wide, not extending beyond the spikelets, these not sunken in hollows of the rachis. Plants perennial... 1. *A. AUREUS*
- aa. Rachis glabrous or scabrous.
- b. Plants annual. Spikelets about 1.3 mm. long..... 4. *A. CAPILLARIS*
- bb. Plants perennial.
- c. Spikelets 3–3.5 mm. long.
- d. Blades conspicuously conduplicate, linear, the margins parallel. Fruit with a short tuft of hairs at the tip..... 9. *A. CAESPITOSUS*
- dd. Blades flat or folded only at the base, narrowed toward both ends.
- e. Second glume and sterile lemma extending well beyond the fruit, the lemma pubescent between the nerves; racemes 2–6 on a relatively short axis; plants caespitose, not stoloniferous. 10. *A. CENTRALIS*
- ee. Second glume and sterile lemma scarcely longer than the fruit, glabrous or nearly so; racemes several to numerous in a rather dense inflorescence, as much as 40 cm. long; plants stoloniferous..... 6. *A. SCOPARIUS*
- cc. Spikelets 1.7–2.5 mm. long (rarely 3 mm. long in *A. compressus*).
- d. Spikelets 1.7–1.8 mm. long, glabrous; blades sparsely ciliate with long hairs..... 7. *A. ATER*
- dd. Spikelets 2–2.5 mm. long, pubescent.
- e. Blades 1–4 mm. wide, densely pubescent on the upper surface toward the base; plants densely caespitose, sometimes tardily stoloniferous; spikelets with a rather prominent tuft of stiff hairs at the tip..... 8. *A. PURPUSII*
- ee. Blades 6–10 mm. wide, glabrous; plants freely stoloniferous; spikelets sparsely pubescent on the internerves..... 5. *A. COMPRESSUS*

1. *AXONOPUS AUREUS* Beauv. Ess. Agrost. 12, 154. 1812.

*Paspalum aureum* H.B.K. Nov. Gen. & Sp. 1:93. 1815.

*Digitaria aurea* Spreng. Syst. Veg. 1:272. 1825.

*Paspalum pulchrum* Nees, Agrost. Bras. 79. 1829.

*Paspalum exasperatum* Nees, Agrost. Bras. 81. 1829.

*Paspalum pulchrum* var. *angustifolium* Doell in Mart. Fl. Bras. 2<sup>2</sup>:116. 1877.

*Paspalum carinato-vaginatatum* Mez, Repert. Sp. Nov. (Fedde) 15:31. 1917.

*Axonopus pulcher* Kuhl. Comm. Linhas Telegr. Estrat. Matto Grosso 67:88. 1922.

Perennial; culms 35–90 cm. high, rarely more than 1 m., erect, branching; sheaths compressed, keeled, glabrous, the margins sometimes ciliate; ligule ciliate, about 0.5 mm. long; blades 4–15 cm. long, 3–9 mm. wide, spreading, firm, flat or drying involute toward the tip, glabrous, the margins scabrous, sometimes sparsely ciliate toward the rounded base; racemes 2–15, slender, ascending, crowded on a short hairy axis; rachis 0.4–0.7 mm. wide, conspicuously papillose-ciliate with stiff golden-yellow or brown hairs, bearing below each spikelet a tuft of similar hairs; spikelets 1.3 mm. long, glabrous or sparsely appressed-hispid.

Wet sandy savannas, Puerto Rico and Trinidad; British Honduras to Brazil and Bolivia.

CHIRIQUÍ: Cerro Vaca, *Pittier* 5367; San Felix, *Pittier* 5232. COCLÉ: Natá, *Allen* 846; El Valle de Antón, *Allen* 2822. CANAL ZONE: Río Azote Caballo, *Dodge*, *Steyermark* & *Allen* 16859; Corozal, *Hitchcock* 7987; Ancón Hill, *Killip* 4067. PANAMÁ: Taboga Island, *Macbride* 2837; *Standley* 28007.

2. *AXONOPUS CHRYSOBLEPHARIS* (Lag.) Chase, Proc. Biol. Soc. Washington 24:134. 1911.

*Cabrera chrysolepharis* Lag. Gen. & Sp. Nov. 5. 1816.

*Paspalum excavatum* Nees ex Trin. Gram. Pan. 88. 1826.



*Paspalum immersum* Nees, Agrost. Bras. 82. 1829.

*Panicum immersum* Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 1:197. 1834.

*Panicum chrysoblephare* Steud. Syn. Pl. Glum. 1:38. 1854.

*Paspalum chrysoblephare* Doell in Mart. Fl. Bras. 2<sup>2</sup>:119. 1877.

Perennial; culms 60–100 cm. high, slender to rather stout, erect or ascending, branching from the middle nodes, straw-colored or brown, smooth and shining, the nodes densely bearded with golden-yellow hairs; sheaths much shorter than the internodes, keeled but scarcely compressed, densely papillose-hispid with spreading hairs; ligule a short ciliate membrane about 0.2 mm. long; blades 8–25 cm. long, 5–12 mm. wide, acuminate, narrowed toward the scarcely rounded base, nearly glabrous to pilose or papillose-pilose, the margins smooth or sometimes papillose-hispid-ciliate; racemes 4–7, stiffly and usually narrowly ascending, crowded on a short rather stout axis, 4–10 cm. long; rachis 1.2–1.5 mm. wide, extending beyond the spikelets, the margins and ridge separating the two rows of spikelets prominently hispid or papillose-hispid with stiff golden-yellow hairs; spikelets about 1.5 mm. long, obtuse, deeply sunken in the cavities of the rachis.

Savannas and grassy slopes, Costa Rica to Bolivia and Paraguay.

CANAL ZONE: Ancón Hill, *Standley 25199*. PANAMÁ: Hacienda La Joya, *Dodge, Hunter, Steyermark & Allen 16892*. Without locality, *Née* (TYPE).

3. AXONOPUS APPENDICULATUS (Presl) Hitchc. & Chase, Contr. U. S. Nat. Herb. 18:300. 1917.

*Paspalum appendiculatum* Presl, Rel. Haenk. 1:211. 1830.

Annual; culms 25–60 cm. high, slender, erect, compressed, sparingly branched, straw-colored, smooth and shining; sheaths mostly much shorter than the internodes, compressed, glabrous; ligule about 0.3 mm. long, densely ciliate; blades 5–15 cm. long, 4–10 mm. wide, thin, flat, acuminate, rounded at the base, glabrous or rarely sparsely papillose, the margins finely scabrous and sometimes sparsely papillose-hispid; racemes 2–8, stiffly ascending to arcuate-spreading, 2–4 cm. long, approximate on a short stout angular axis; rachis about 1.2 mm. wide, prolonged beyond the spikelets but often terminated with a rudimentary spikelet, the margins and ridge separating the two rows of spikelets prominently and densely papillose-hispid with yellow or golden hairs, the papillae exceptionally large; spikelets 1.2–1.3 mm. long, somewhat pointed, glabrous, sunken in rather deep cavities of the rachis.

Savannas, thickets, and grassy slopes, often in moist ground, Trinidad, Panama, and northeastern Brazil.

COCLÉ: between Paso del Arado and Olá, *Pittier 5021*; Olá, *Pittier 5052*. Without locality, *Haenke* (TYPE).

4. AXONOPUS CAPILLARIS (Lam.) Chase, Proc. Biol. Soc. Washington 24:133. 1911.

*Paspalum capillare* Lam. Tabl. Encycl. 1:176. 1791.

*Panicum minutum* Trin. Linnaea 10:293. 1836.

*Anastrophus capillaris* Nash, N. Amer. Fl. 17:161. 1912.



Annual; culms 10–30 cm., or sometimes as much as 50 cm., high, very slender, erect or ascending, sometimes geniculate-spreading, branching at the lower nodes, glabrous; sheaths keeled, glabrous or usually pilose, the margins rather densely ciliate, the lower ones crowded, usually longer than the internodes, the upper elongate; blades 2.5–15 cm. long, 4–10 mm. wide, thin, glabrous, the margins more or less ciliate toward the rounded or subcordate base; inflorescences long-exserted on slender peduncles, terminal and axillary from the upper sheath; racemes mostly 2 or 3, sometimes 4 or 5, slender, ascending or spreading, the 2 upper ones conjugate, the others a short distance below, the rachis about 0.5 mm. wide, flexuous, the margins scabrous; spikelets about 1.3 mm. long, obscurely pointed, glabrous or sparingly pubescent.

Moist open ground; a weed in fields and waste places, Costa Rica and Trinidad to Brazil.

PANAMÁ: Panamá, *Gagelin* 493.

5. *AXONOPUS COMPRESSUS* (Swartz) Beauv. Ess. Agrost. 12. 1812.

*Milium compressum* Swartz, Prodr. Veg. Ind. Occ. 24. 1788.

*Paspalum platicaulon* Poir. in Lam. Encycl. Suppl. 5:34. 1804.

*Agrostis compressa* Poir. in Lam. Encycl. Suppl. 1:259. 1810. Not *A. compressa* Willd., 1790.

*Paspalum compressum* Raspail, Ann. Sci. Nat. 5:301. 1825.

*Paspalum laticulmum* Spreng. Syst. Veg. 1:245. 1825.

*Digitaria platicaulis* Desv. Opusc. 62. 1831.

*Paspalum filostachyum* A. Rich. ex Steud. Syn. Pl. Glum. 1:20. 1854.

*Anastrophus compressus* Schlecht. ex Doell in Mart. Fl. Bras. 2<sup>2</sup>:102. 1877.

*Paspalum raunkiaerii* Mez, Repert. Sp. Nov. (Fedde) 15:60. 1917.

Stoloniferous perennial; culms in small tufts, 15–60 cm. high, compressed, erect or ascending, the nodes appressed-pubescent or sometimes bearded; stolons long, leafy, with short blades; sheaths keeled, glabrous, pubescent on the collar, the margins hyaline, glabrous or ciliate, the lower ones relatively short, much longer than the internodes, the upper one elongate; blades 5–15 cm. long, or those of the innovations elongate, 6–10 mm. wide, rarely as little as 4 mm. or as much as 12 mm. wide, obtuse, rounded at the base, glabrous, the margins usually ciliate at least toward the base; inflorescences terminal and axillary from the upper sheaths, composed of 2–5 ascending or spreading racemes, 3–9 cm. long, the upper two conjugate, the others a short distance below; spikelets 2–2.5 mm. long (rarely 3 mm.), the second glume and sterile lemma pointed beyond the fruit, glabrous or sparsely pubescent on the internerves; fruit 1.5–2 mm. long, oblong, minutely roughened.

Open ground, fields, open woods and brushy slopes, usually in moist ground, Florida and the West Indies to Argentina; also in warmer parts of the Old World.

CHIRIQUÍ: Dolega, *Hitchcock* 8341. COCLÉ: Aguadulce, *Pittier* 4931. CANAL ZONE: Barro Colorado Island, *Bailey & Bailey* 497; Gamboa, *Standley* 28485; Juan Mina, *Piper* 5211; *Bartlett & Lasser* 16495; Culebra, *Pittier* 3742; *Hitchcock* 7912, 7913; Summit, *Standley* 25702; Ancón, *Hitchcock* 19892, 19893; Ancón Hill, *Piper* 5212; Balboa, *Standley* 25650, 26476; *Piper* 5214. PANAMÁ: Chepo, *Pittier* 4452, 4634; Taboga Island, *Hitchcock* 8063; Chagres Valley, *Pittier* 3462.



6. *AXONOPUS SCOPARIUS* (Flügge) Kuhl. Comm. Linhas Telegr. Estrat. Matto Grosso 67:45. 1922.

*Paspalus scoparius* Flügge, Monogr. Pasp. 124. 1810.

*Paspalum iridifolium* Poepp. Reise 2:324. 1836.

*Panicum giganteum* Kuntze, Rev. Gen. Pl. 3<sup>3</sup>:360. 1898.

*Anthaenantia gigantea* Schum. in Just's Bot. Jahresb. 26<sup>1</sup>:329. 1900.

*Paspalum fournierianum* var. *maximum* Thellung, Mém. Soc. Sci. (Nat.) Neuchâtel 5:344. 1913.

*Paspalum tripinnatum* Mez, Repert. Sp. Nov. (Fedde) 15:64. 1917.

Stout, stoloniferous perennial; culms mostly 1–2 m. high, erect, glabrous, or the nodes sometimes pubescent; sheaths mostly longer than the internodes, compressed, glabrous or sometimes pilose on the collar and margins; blades 20–60 cm. long, mostly 1–3 cm. wide, flat, glabrous, or rarely pubescent; inflorescence as much as 40 cm. long, composed of few to many ascending racemes 8–16 cm. long; spikelets 3 mm. long, glabrous or sparsely pilose, usually purple-tinged, the second glume and sterile lemma rather strongly nerved.

Hillsides and savannas, Central America to Brazil and Bolivia.

CHIRIQUÍ: Cerro Vaca, Pittier 5369.

7. *AXONOPUS ATER* Chase, Jour. Washington Acad. Sci. 17:143. 1927.

Perennial; culms densely tufted, 40–50 cm. high, erect or ascending, simple, compressed, glabrous, the nodes densely appressed-pubescent; sheaths much shorter than the internodes, keeled, the margins ciliate or sometimes glabrous; ligule short, fimbriate; blades 4–15 cm. long, 4–5 mm. wide, stiff, folded, obtuse, scabrous at the apex, the margins scabrous, papillose-ciliate; inflorescences terminal and axillary, long-exserted; racemes 2–5, the upper two or three digitate, the others a short distance below, 4–6 cm. long, ascending to widely spreading, the rachis about 6 mm. wide, the margins scabrous, the central angle sharply raised; spikelets 1.7–1.8 mm. long, relatively distant, oblong-elliptic, abruptly pointed, the glume and sterile lemma equal, just covering the fruit, glabrous or obscurely pubescent.

Waste ground, Panama; known only from the type collection.

CANAL ZONE: Gatún, Hitchcock 7976 (TYPE).

8. *AXONOPUS PURPUSII* (Mez) Chase, Jour. Washington Acad. Sci. 17:144. 1927.

*Paspalum purpusii* Mez, Bot. Jahrb. (Engler) 56: Beibl. 125:10. 1921.

Perennial; culms very slender, densely tufted, erect, 15–40 cm. high; leaves crowded toward the base, only one about the midculm, this with elongated sheath and reduced blade; sheaths compressed, keeled, glabrous to sparsely pilose with a dense tuft of hairs at the mouth; blades flat, conduplicate at the base, mostly 5–10 cm. long, rarely as much as 20 cm., 1–4 mm. wide, densely hairy on the upper surface toward the base, otherwise sparsely pilose or nearly glabrous; inflorescences terminal and sometimes axillary, composed of 2–4 slender ascending racemes 3–8 cm. long; spikelets 2 mm. long; second glume and sterile lemma somewhat pointed beyond the fruit, the margins stiffly appressed-pilose, the hairs longer at the summit, forming a rather prominent tuft at the tip of the spikelet.



Wet savannas and open woods, southern Mexico to Argentina.

CHIRIQUÍ: David, *Hitchcock* 8362, 8368; Dolega, *Hitchcock* 8342. CANAL ZONE: Summit, *Higgins* 202; Corozal, *Piper* 5210; Balboa, *Hitchcock* 8018. PANAMÁ: Río Tecúmen, *Standley* 26504; Chorrera, *Standley* 8148½; Panamá, *Standley* 27762.

9. *AXONOPUS caespitosus* Swallen, sp. nov.

Perennis; culmi 60–90 cm. alti, erecti, dense caespitosi, nodiis dense barbatis; vaginae inferiores approximatae, latae, compressae, carinatae, glabrae; ligula ciliata, ca. 1 mm. longa; laminae 15–40 cm. longae, 4–6 mm. latae, planae, basi conduplicatae, glabrae, marginibus dense papilloso-ciliatis; racemi 4–6, 8–14 cm. longi, anguste adscendentes; rachis flexuosa, ca. 0.4 mm. lata, scabra; spiculae 3–3.5 mm. longae; gluma secunda et lemma aequalia fructu longiora, sparse pilosa; fructus 2.5–2.8 mm. longus, oblongo-ellipticus, minute rugosus, apice pilosus.

Perennial; culms erect in large clumps, 60–90 cm. high, the nodes densely bearded with rather short ascending hairs; basal sheaths crowded, broad, subequitant, strongly compressed, keeled, glabrous, or pubescent on the collar; ligule ciliate, about 1 mm. long; blades 15–40 cm. long, 4–6 mm. wide, flat, conduplicate at the base, glabrous, the margins densely papillose-ciliate toward the base; inflorescences terminal and axillary from the upper sheath, composed of 4–6 erect or narrowly ascending racemes 8–14 cm. long; rachis triangular, flexuous, about 0.4 mm. wide, scabrous on the angles; spikelets 3–3.5 mm. long; second glume and sterile lemma thin, equal, acute, pointed beyond the fruit, sparsely pilose, the hairs longer and denser at the tip, the two lateral nerves approximate; fruit 2.5–2.8 mm. long, oblong-elliptic, very minutely rugose, with a small tuft of soft hairs at the acute tip.

Open grassy hills, Taboga Island, where it makes up a large part of the grass flora.

PANAMÁ: Taboga Island, grassy hills, forming bulk of grass, Sept. 12, 1911, *Hitchcock* 8089 (U. S. Nat. Herb., TYPE); *Pittier* 3565, 3582.

10. *AXONOPUS CENTRALIS* Chase, Jour. Washington Acad. Sci. 17:143. 1927.

Perennial; culms in large clumps, 40–90 cm. high, erect to stiffly spreading, simple, compressed, glabrous; sheaths keeled, usually pubescent on the margins at least toward the summit and on the collar, otherwise glabrous; ligule short, firm, fimbriate; blades 15–50 cm. long, 6–10 mm. wide, flat, or folded at the base, sparsely pubescent on the upper surface, glabrous on the lower, the margins ciliate toward the base; inflorescences terminal and axillary, finally long-exserted; racemes 2–6, 8–15 cm. long, ascending or spreading, the upper 2 or 3 approximate, the lower remote, the rachis about 0.5 mm. wide, flexuous, minutely scabrous on the margins; spikelets 3 mm. long, oblong, rather distant, the glume and sterile lemma equal, extending beyond the fruit, silky pubescent on the internerves; fruit 2 mm. long, oblong-elliptic, pale.

Open or wooded grassy hillsides, Nicaragua, Salvador, Panama, and Venezuela.

CANAL ZONE: Ancón, *Hitchcock* 19891; between Culebra and Pedro Miguel, *Hitchcock* 7928 (TYPE); Balboa, *Hitchcock* 8019. PANAMÁ: Taboga Island, *Hitchcock* 8077.



## 52. PASPALUM L.

PASPALUM L. Syst. Nat. ed. 10. 2:855. 1759.

Spikelets plano-convex, solitary or in pairs, arranged in two rows on one side of a narrow wingless to broadly winged rachis, the back of the fruit turned toward the rachis; first glume wanting or present on some, occasionally on all of the spikelets; second glume and sterile lemma equal, covering the fruit, or the glume a little shorter, rarely wanting; fruit indurate, usually pale, sometimes dark brown, smooth and shining or minutely striate, the margins of the lemma inrolled, enclosing the palea.

Annuals or perennials with one to many racemes, these solitary, paired, or racemose at the summit of the main culm and branches.

- a. Inflorescence feathery, composed of numerous, very slender, drooping racemes, crowded on a short axis..... 39. *P. SACCHAROIDES*
- aa. Inflorescence not feathery, the racemes, if hairy, not long, slender, and drooping.
  - b. Rachis winged, with broad membranaceous margins, or if narrowly winged, the spikelets conspicuously fringed with long hairs.
  - c. Plants terrestrial; spikelets conspicuously silky or fringed with long hairs.
  - d. Spikelets 2.5–3.2 mm. long; second glume wingless; sterile lemma inconspicuously fringed.
    - e. Racemes solitary or sometimes paired, the rachis 5–7 mm. wide; culms simple..... 1. *P. STELLATUM*
    - ee. Racemes 2–7, sometimes solitary on the branches, never paired, the rachis 2–4 mm. wide; culms usually branching.
    - f. Blades 2–3.5 mm. wide, flat or becoming involute; racemes 1–6 cm. long, the rachis 3–4 mm. wide; culms slender, erect..... 2. *P. HETEROTRICHON*
    - ff. Blades 6–15 mm. wide, flat; racemes 5–10 cm. long, the rachis 2–3 mm. wide; culms relatively coarse, decumbent at the somewhat woody base..... 3. *P. HUMBOLDTIANUM*
  - dd. Spikelets 4.5–6 mm. long; second glume broadly winged; sterile lemma fringed with long hairs.
    - e. Rachis narrower than the spikelets; glume cordate at base; fruit ciliate..... 4. *P. PECTINATUM*
    - ee. Rachis wider than the spikelets; glume not cordate at the base; fruit glabrous..... 5. *P. CONTRACTUM*
- cc. Plants aquatic; spikelets glabrous.
  - d. Second glume well developed; spikelets 1.4–2 mm. long, elliptic, acute, in two rows, numerous on each raceme..... 6. *P. REPENS*
  - dd. Second glume wanting; spikelets 2.3–2.5 mm. long, oblong, obtuse, appearing as if in a single row, relatively few on each raceme..... 7. *P. CANDIDUM*
- bb. Rachis wingless, or if narrowly winged, the spikelets not conspicuously silky or fringed with long hairs.
  - c. Racemes 2, conjugate or nearly so at the summit of the culm, rarely a third one a short distance below.
  - d. Plants extensively stoloniferous.
    - e. Spikelets 1.4–2.2 mm. long, ovate, sparsely long-ciliate around the margins..... 26. *P. CONJUGATUM*
    - ee. Spikelets 3–4.5 mm. long, glabrous. Sea-coast plants..... 8. *P. VAGINATUM*
  - dd. Plants caespitose or rhizomatous, but not stoloniferous.
    - e. Plants perennial; spikelets 2 mm. long or more.
    - f. Spikelets 2–3.8 mm. long, ovate to obovate, or, if elliptic, pubescent.
    - g. Rhizomes stout, horizontal, forming a tough sod; spikelets glabrous.



- h. Spikelets 2.5–3.8 mm. long, ovate to obovate, smooth and shining..... 9. *P. NOTATUM*
- hh. Spikelets 2–2.5 mm. long, oval, less shining than the preceding..... 10. *P. MINUS*
- gg. Rhizomes short; spikelets pubescent..... 11. *P. SUBCILIATUM*
- ff. Spikelets 4–4.5 mm. long, elliptic, glabrous, with a short tuft of hairs on either side at the base. Base of plant usually covered with old shredded sheaths..... 12. *P. LINEARE*
- ee. Plants annual; spikelets 1.1–1.5 mm. long.
- f. Spikelets subhemispheric, solitary, beaded with globular hairs, rarely glabrous..... 18. *P. MULTICAULE*
- ff. Spikelets elliptic or obovate, paired, pubescent with capitate hairs..... 19. *P. CLAVULIFERUM*
- cc. Racemes 1–many, racemose or fascicled on the axis, not conjugate.
- d. Second glume wanting. Pedicels bearing stiff hairs at least as long as the spikelet..... 37. *P. GARDNERIANUM*
- dd. Second glume well developed.
- e. First glume present on at least one of a pair of spikelets (see also *P. fasciculatum*, a coarse aquatic).
- f. Plants decumbent, creeping; spikelets not more than 2 mm. long.
- g. First glume about equally developed on all spikelets..... 14. *P. DECUMBENS*
- gg. First glume wanting, or occasionally developed, especially on the secondary spikelet..... 15. *P. NUTANS*
- ff. Plants erect; spikelets 2.6–3 mm. long..... 16. *P. PILOSUM*
- ee. First glume wanting, or occasionally developed on some of the spikelets.
- f. Racemes terminal and axillary, the axillary sometimes hidden in the sheaths.
- g. Culms decumbent, rooting at the lower nodes; first glume occasionally developed..... 15. *P. NUTANS*
- gg. Culms erect; first glume always wanting..... 13. *P. PROPINQUUM*
- ff. Racemes terminal only on the main culm and branches.
- g. Plants annual.
- h. Spikelets with a broad firm notched margin..... 38. *P. FIMBRIATUM*
- hh. Spikelets without a broad notched margin.
- i. Fruit pale; spikelets not more than 1.5 mm. long.
- j. Spikelets 0.8 mm. long, oblong-elliptic, glabrous, with raised margins; rachis zigzag..... 20. *P. PARVIFLORUM*
- jj. Spikelets 1.1–1.6 mm. long, hemispherical or elliptic, sparsely to densely covered with globular or capitate hairs.
- k. Blades 6–20 mm. wide; racemes 6–35, scattered on a long axis..... 22. *P. MICROSTACHYUM*
- kk. Blades not more than 2.5 mm. wide; racemes 1 or 2.
- l. Spikelets subhemispheric, solitary, beaded with globular hairs, rarely glabrous..... 18. *P. MULTICAULE*
- ll. Spikelets elliptic or obovate, paired, pubescent with capitate hairs..... 19. *P. CLAVULIFERUM*
- ii. Fruit dark brown, smooth and shining.
- j. Spikelets suborbicular, or if obovate, 2.2–3 mm. long.
- k. Culms slender, mostly 20–40 cm. high, decumbent-spreading; racemes 1–4, the rachis 1–2 mm. wide; sheaths and blades usually rather conspicuously papillose-pilose..... 34. *P. CONVEXUM*
- kk. Culms mostly stout, commonly 40–60 cm. high; racemes commonly 4–11, the rachis 2–2.5 mm. wide; sheaths and blades glabrous or nearly so..... 35. *P. BOSCIANUM*
- jj. Spikelets obovate, 2 mm. long..... 36. *P. MELANOSPERMUM*
- gg. Plants perennial.
- h. Culms creeping, rooting at the lower nodes. Spikelets solitary, not more than 1.8 mm. long.



- i. Spikelets suborbicular.
- j. Blades 1-6 cm. long; spikelets 1-1.2 mm. long.  
Plants stoloniferous..... 23. *P. ORBICULATUM*
- jj. Blades 5-13 cm. long; spikelets 1.7-1.8 mm.  
long. Subaquatic..... 25. *P. HITCHCOCKII*
- ii. Spikelets ovate to more or less elliptic, acutish..... 24. *P. JIMENEZII*
- hh. Culms not creeping, if rooting at the lower nodes the  
spikelets in pairs or more than 4 mm. long.
- i. Plants stoloniferous, coarse, succulent; spikelets 4-  
4.5 mm. long, solitary. Racemes usually numerous,  
arranged in a dense flabellate inflorescence..... 27. *P. FASCICULATUM*
- ii. Plants not stoloniferous, erect; spikelets not more  
than 3.9 mm. long, usually much less.
- j. Fruit dark brown, smooth and shining.
- k. Sterile lemma wrinkled just within the margins. 32. *P. Plicatum*
- kk. Sterile lemma flat..... 33. *P. CENTRALE*
- jj. Fruit pale to stramineous, or if brown not shin-  
ing, striate-roughened.
- k. Spikelets 1.3-1.6 mm. long; culms usually  
slender.
- l. Racemes 7-60, the lower ones 4-12 cm. long;  
culms 0.3-2 m. high; spikelets subhemispher-  
ical, 1.3-1.5 mm. long, pubescent..... 17. *P. PANICULATUM*
- ll. Racemes 2-4, 2.2-4 cm. long; culms 20-27  
cm. high; spikelets narrowly obovate or ellip-  
tic, 1.6 mm. long; glabrous..... 21. *P. STANDLEYI*
- kk. Spikelets 1.9 mm. long or more; culms coarse  
and robust, mostly 1-2 m. high.
- l. Culms freely branching at maturity. Spike-  
lets elliptic, glandular-pubescent, 2-2.5 mm.  
long..... 31. *P. CORYPHEUM*
- ll. Culms simple or with a few simple branches.
- m. Spikelets obovate or suborbicular, 1.9-3  
mm. long.
- n. Racemes 50-100, crowded; spikelets  
1.9-2.2 mm. long, glabrous; fruit pale 30. *P. DENSUM*
- nn. Racemes less than 30, commonly 10-16;  
spikelets 2.2-3 mm. long; fruit dark  
brown..... 28. *P. VIRGATUM*
- mm. Spikelets elliptic, acute, 3.5-3.9 mm.  
long. Second glume ciliate on the mar-  
gins toward the summit, otherwise gla-  
brous..... 29. *P. ACUTUM*

1. *PASPALUM STELLATUM* Humb. & Bonpl. in Flüggé, Monogr. Pasp. 62. 1810.

*Paspalus stellatus* var. *monostachyus* Nees, Agrost. Bras. 78. 1829.

*Paspalus stellatus* var. *distachyus* Nees, Agrost. Bras. 78. 1829.

*Paspalum cujabense* Trin. Gram. Icon. 3: pl. 284. 1831.

*Paspalum wagnerianum* Schlecht. Linnaea 26:133. 1853.

*Paspalum splendens* var. *sphacelatum* Hack. Oesterr. Bot. Zeitschr. 51:239. 1901.

*Paspalum stellatum* forma *hirsuta* Hack. in Stuck. Anal. Mus. Nac. Buenos Aires 21:28. 1911.

Perennial; culms 40-80 cm. high, erect, simple, glabrous or appressed-pubescent toward the summit; sheaths mostly longer than the internodes, the lower papillose-hirsute, the upper nearly glabrous; ligule membranaceous, ciliate, about 0.5 mm. long; blades 8-25 cm. long, 2-3 mm. wide, the uppermost reduced, involute-setaceous or flat toward the base, papillose-pilose or the lower surface glabrous; racemes 2.5-10 cm. long, solitary or paired, ascending, the rachis 5-7 mm. wide, golden-brown or purplish, the short peduncle pubescent; spikelets about



3 mm. long, solitary, closely imbricate on short radiately pilose pedicels; glume and sterile lemma subequal, the margins fringed with white hairs, those on the upper half much exceeding the spikelet; fruit 2 mm. long, minutely stipitate, smooth and shining.

Savannas and open rocky slopes, Mexico (Oaxaca) and Hispaniola to Argentina.

COCLÉ: between Paso del Arado and Olá, *Pittier 5020*; Picacho de Olá, *Pittier 5064*; El Valle de Antón, *Allen 2823*. VERAGUAS: Santiago, *Allen 1017*.

2. *PASPALUM HETEROTRICHON* Trin. Gram. Icon. 3: *pl.* 285. 1831.

*Paspalum* (*Ceresia*) *gracile* Schlecht. Linnaea 10:134. 1854. Not *P. gracile* Rudge, 1805.

*Paspalum heterotrichum* var. *paucispicatum* Hack. Notizbl. Bot. Gart. Berlin 1:328. 1897.



Fig. 18. *Paspalum heterotrichon*

mm. long, scarcely indurate, minutely puberulent at the apex.

Dry woods and grassy hillsides, Haiti; Panama to Peru and Brazil.

CHIRIQUÍ: El Boquete, *Hitchcock 8235, 8297*; Volcán de Chiriquí, *Killip 4555*.

3. *PASPALUM HUMBOLDTIANUM* Flügge, Monogr. Pasp. 67. 1810.

*Paspalum distichophyllum* H.B.K. Nov. Gen. & Sp. 1:86. 1815.

*Paspalum ciliatum* H.B.K. Nov. Gen. & Sp. 1:87. *pl.* 24. 1815. Not *P. ciliatum* Lam., 1791.

*Paspalum blepharophorum* Roem. & Schult. Syst. Veg. 2:292. 1817.

*Panicum obtectum* Presl, Rel. Haenk. 1:301. 1830.

*Tricholaena obtecta* Fourn. Mex. Pl. 2:35. 1886.

Perennial; culms tufted, 50–90 cm. high, slender, wiry, finally branching from the middle and upper nodes, the nodes bearded with appressed hairs; sheaths longer than the internodes, the margins ciliate, pubescent on the collar, with a tuft of usually long hairs at the throat; blades 3–15 cm. long, 2–3.5 mm. wide, involute, acuminate or attenuate to a rather fine point, puberulent on the upper surface, the lower surface glabrous or nearly so; racemes 1–7, 1–6 cm. long, ascending-falcate on very short bearded peduncles, the rachis 3–4 mm. wide, golden; spikelets 2.5 mm. long, solitary, imbricate, acute, somewhat obscured by the long white hairs on the margins and at the base of the glume, the sterile lemma narrower, short-ciliate toward the apex; fruit 1.7



*Panicum humboldtianum* Kuntze, Rev. Gen. Pl. 3<sup>3</sup>:361. 1898.

Perennial; culms 40–105 cm. high, erect from a decumbent almost woody base, commonly branching, the nodes bearded with ascending hairs; sheaths mostly longer than the internodes, sometimes crowded, papillose-hispid at least toward the summit; ligule 1–2 mm. long, dark brown; blades 8–18 cm. long, 6–15 mm. wide, acuminate, firm, stiffly spreading, the upper surface glabrous or nearly so, the lower surface usually pubescent, also with a few scattered long hairs, the margins prominently papillose-hispid at least toward the base; racemes mostly 2–5, rarely more, 5–10 cm. long, ascending or drooping, the rachis 2–3 mm. wide with a tuft of long hairs at the base; spikelets 3.2 mm. long, solitary or paired, elliptic, acute, the glume and sterile lemma equal, fringed with long spreading glistening white hairs; fruit about 2.8 mm. long, smooth and shining.

Open or brushy slopes, Mexico to Argentina.

CHIRIQUÍ: El Boquete, *Hitchcock* 8186; *Killip* 4522.

4. *PASPALUM PECTINATUM* Nees in Trin. Gram. Icon. 1: *pl.* 117. 1828.

*Anastrophus pectinatus* Schlecht. ex Jacks. Ind. Kew. 1:118. 1893.

Perennial; culms in coarse tufts 30–100 cm. high, simple, erect, glabrous; lower sheaths crowded, firm, reddish, harshly villous toward the summit, smooth and shining toward the base; ligule firm, about 1 mm. long; blades 12–60 cm. long, 3–5 mm. wide, the uppermost reduced, erect or nearly so, densely harshly villous; racemes usually 2, sometimes 1 or 3, erect or ascending, 4–8 cm. long, the rachis 1.8–2.3 mm. wide, the margins irregular, densely villous with rather coarse hairs at the base; spikelets 4.5–6 mm. long, solitary, imbricate; glume and sterile lemma flat, cordate-lanceolate, the sterile lemma narrower and shorter than the glume, sparsely tuberculate-hispid on the back, the thickened margins tuberculate-ciliate with stiff spreading hairs 2–3 mm. long; fruit 4.2–4.5 mm. long, lanceolate, obtuse, the lemma and palea rather thin, the lemma shortly ciliate toward the summit.

Savannas and open rocky slopes, Honduras to southern Brazil.

CHIRIQUÍ: Cerro Vaca, *Pittier* 4351. PANAMÁ: Taboga Island, *Pittier* 3584; *Hitchcock* 8096.

5. *PASPALUM CONTRACTUM* Pilger, Bot. Jahrb. (Engler) 25:709. 1898.

*Paspalum echinotrichum* Mez, Bot. Jahrb. (Engler) 56: Beibl. 125:9. 1921.

Perennial; culms 50–90 cm. high, tufted, erect, the lower and middle nodes with a dense ring of erect white hairs; leaves mostly crowded toward the base, the lower sheaths densely papillose-pilose toward the summit, glabrate and becoming more or less fibrous toward the base, the upper ones glabrous, nearly bladeless; ligule about 1 mm. long, firm, dark brown; blades 10–25 cm. long, 2–4 mm. wide, erect or nearly so, densely long-pilose on both surfaces, the margins sparsely papillose-ciliate; racemes 2 or 3, suberect, 3.5–7 cm. long, the rachis 4.5–5 mm. wide, densely pilose at the base, the center greenish, the wings golden-brown; spikelets 5–5.5 mm. long, solitary, closely imbricate, lanceolate, acuminate, densely



bearded at the base; sterile lemma a little shorter and narrower than the glume, the thickened margins papillose-ciliate, the hairs becoming sparse toward the summit; fruit 3.8 mm. long, pale, glabrous, minutely stipitate.

Open slopes, Panama to Brazil.

COCLÉ: Picacho de Olá, *Pittier* 5063.

6. *PASPALUM REPENS* Bergius, Act. Helv. Phys. Math. 7:129. *pl.* 7. 1762.

*Paspalum gracile* Rudge, Pl. Guian. 20. *pl.* 26. 1805.

*Paspalum mucronatum* Muhl. Cat. Pl. 8. 1813.

*Ceresia fluitans* Ell. Bot. S. C. & Ga. 1:109. *pl.* 6. *f.* 4. 1816.

*Paspalum mucronatum* Muhl. Descr. Gram. 96. 1817.

*Paspalum natans* LeConte, Jour. de Phys. Chym. 91:285. 1820.

*Paspalum fluitans* Kunth, Rév. Gram. 1:24. 1829.

*Paspalum pyramidale* Nees, Agrost. Bras. 77. 1829.

*Paspalum frankii* Steud. Syn. Pl. Glum. 1:19. 1854.

*Paspalum bistipulatum* Hochst. ex Steud. Syn. Pl. Glum. 1:29. 1854.

*Cymatocloa fluitans* Schlecht. Bot. Zeit. 12:822. 1854.

*Cymatocloa repens* Schlecht. Bot. Zeit. 12:822. 1854.

Aquatic perennial; culms submerged, spongy, with long roots at the nodes and numerous floating branches, the nodes glabrous or sometimes hispid; sheaths longer than the internodes, inflated except the uppermost on the branches, soft, papery, glabrous or sparsely papillose-hispid, auriculate; ligule 1–2 mm. long, brown; blades 10–27 cm. long, 1.2–2.5 cm. wide, thin, flat, scabrous; panicles 10–20 cm. long, shortly exserted; racemes numerous, mostly 3–5 cm. long, spreading or even reflexed, the rachis about 1.5 mm. wide, scabrous on the margins, acuminate, extending beyond the spikelets, naked for a short distance at the base; spikelets 1.4–2 mm. long, solitary, whitish, pubescent or glabrous, the glumes and sterile lemma pointed beyond the fruit; fruit 1.4–1.7 mm. long, smooth and shining.

Floating in open water on margins of rivers, lakes, and canals, sometimes creeping in wet places, South Carolina to Indiana and Kansas, south to Paraguay.

CANAL ZONE: Chagres River, *D. H. Popenoe* 36; Gatún, *Hitchcock* 8031, 9179; Frijoles, *Standley* 31464; Gamboa, *Standley* 28482; Juan Mina, *Piper* 5205; *Bartlett* & *Lasser* 16752; 16885; Pedro Miguel River, *D. P. Curry*; Mindozo River, *Killip* 4231. PANAMÁ: Matías Hernández, *Pittier* 6808; La Jagua, *Bartlett* & *Lasser* 17001, 17010.

7. *PASPALUM CANDIDUM* (Humb. & Bonpl.) Kunth, Mém. Mus. Hist. Nat. 2:68. 1815.

*Reimaria candida* Humb. & Bonpl. ex Flügge, Monogr. Pasp. 214. 1810.

Annuals; culms 15 cm. to more than 1 m. or more long, erect or ascending from a decumbent base, straggling or even clambering, rooting at the lower nodes, freely branching, flattened, smooth and shining or rarely retrorsely scabrous below the nodes; sheaths usually shorter than the internodes, thin and rather loose, the margins ciliate toward the summit; ligule about 1.5 mm. long, erose; blades 5–10 cm. long, 6–20 cm. wide, thin, flat, pilose or papillose-pilose on both surfaces or nearly glabrous, the margins scabrous; panicles 5–12 cm. long, scarcely exserted; racemes 8–20, ascending or spreading, 2–4 cm. long, falling entire, the rachis



2–2.5 mm. wide, scabrous, densely pubescent at the base, extending beyond the spikelets; spikelets 2.3–2.5 mm. long, solitary, rather distant, oblong, glabrous, the glume wanting; fruit as long as the sterile lemma, white, smooth and shining.

Moist shady banks and open woods, Mexico (Veracruz) to Chile.

CHIRIQUÍ: El Boquete, Killip 4510.

8. *PASPALUM VAGINATUM* Swartz, Prodr. Veg. Ind. Occ. 21. 1788.

*Paspalum littorale* R. Br. Prodr. Fl. Nov. Holl. 188. 1810.

*Digitaria foliosa* Lag. Gen. & Sp. Nov. 4. 1816.

*Paspalum tristachyum* LeConte, Jour. de Phys. Chym. 91:285. 1820.

*Digitaria tristachya* Schult. Mant. 2:261. 1824.

*Paspalum foliosum* Kunth, Rév. Gram. 1:25. 1829.

*Paspalum kleineanum* Presl, Rel. Haenk. 1:209. 1830.

*Paspalum inflatum* A. Rich. in Sagra, Hist. Cuba 11:298. 1850.

*Paspalum vaginatum* var. *longipes* Lange, Naturhist. For. Kjöbenhavn Vid. Medd. 1854:44. 1854.

*Paspalum vaginatum* Gren. & Godr. Fl. Franc. 3:462. 1856. Not *P. vaginatum* Nees, 1829.

*Paspalum distichum* var. *tristachum* Wood, Class-book. ed. 3. 783. 1861.

*Paspalum distichum* var. *vaginatum* Swartz ex Griseb. Fl. Brit. W. Ind. 541. 1864.

*Paspalum vaginatum* var. *nanum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:75. 1877.

*Paspalum reimarioides* Chapm. Fl. South. U. S. 665. 1883.

*Paspalum vaginatum* var. *reimarioides* Chapm. Fl. South. U. S. ed. 3. 577. 1897.

*Paspalum distichum* var. *nanum* Stapf in Thiselt.-Dyer, Fl. Cap. 7:371. 1898.

*Sanguinaria vaginata* Bubani, Fl. Pyr. 4:258. 1901.

Rhizomatous stoloniferous perennial; culms 10–60 cm. high, erect or ascending, strongly compressed, simple or branching, glabrous; stolons as much as 1 m. long, slender to rather stout with short internodes, the sheaths bladeless or with short reflexed blades; sheaths of the culms longer than the internodes, loose, keeled, pilose in the throat; ligule membranaceous, about 0.5 mm. long; blades 2.5–15 cm. long, commonly about 10 cm., 3–8 mm. wide, narrower than the mouth of the sheath, gradually narrowed to a more or less involute tip, conspicuously distichous; racemes 1.5–7.5 cm. long, usually 2, sometimes 3–5, conjugate or approximate, erect to spreading or reflexed, somewhat falcate; spikelets 3–4.5 mm. long, solitary, imbricate, acute, glabrous, the first glume rarely developed; second glume and sterile lemma equal, thin, the lemma transversely undulate; fruit 2.5–3 mm. long, obovate, acute.

Sea-coasts, North Carolina and Baja California to Argentina and Chile; also in the tropics and subtropics of the Eastern Hemisphere.

COLÓN: Río Indio de Fató, Pittier 4261. CANAL ZONE: Cristóbal, Pittier 4232; Hitchcock 8034; Toro Point, Hitchcock 8042; Balboa, Hitchcock 7996; Standley 30881. PANAMÁ: Panamá, Hitchcock 8403; Punta Paitilla, Standley 30799.

9. *PASPALUM NOTATUM* Flüge, Monogr. Pasp. 106. 1810.

*Paspalum taphrophyllum* Steud. Syn. Pl. Glum. 1:19. 1854.

*Paspalum distachyon* Willd. ex Doell in Mart. Fl. Bras. 2<sup>2</sup>:73. 1877. Not *P. distachyon* Poit., 1834.

*Paspalum notatum* var. *latiflorum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:73. 1877.

*Paspalum saltense* Arech. Anal. Mus. Nac. Montevideo 1:53. 1894.

Rhizomatous perennial forming dense sods; culms 15–50 cm. high, flattened,



glabrous; leaves crowded toward the base, the lower sheaths short, overlapping, those of the culm few, elongate; sheaths keeled, compressed, glabrous or sometimes pubescent, the margins often ciliate toward the summit; ligule very short, membranaceous; blades 2–30 cm. long, 3–10 mm. wide, glabrous, the margins ciliate at least toward the base; racemes 2 or rarely 3, 2.5–12 cm. long, subconjugate, ascending, more or less arcuate, the rachis about 1 mm. wide; spikelets 2.5–3.8 mm. long, solitary, ovate or obovate, the glume and sterile lemma equal, firm, smooth and shining; fruit 2.5–3.5 mm. long, oval.

Open ground, Mexico and the West Indies to Argentina.

CHIRIQUÍ: David, *Hitchcock* 8367; Boquete, *Woodson & Schery* 725. COCLÉ: between Las Margaritas and El Valle, *Woodson, Allen & Seibert* 1265. CANAL ZONE: Balboa, *Hitchcock* 7998, 8009. PANAMÁ: Chepo, *Pittier* 4453; Chorrera, *Hitchcock* 8136.

10. *PASPALUM MINUS* Fourn. Mex. Pl. 2:6. 1886.

Perennial, similar in aspect to *P. notatum*; culms 10–40 cm. high, more slender than *P. notatum*; sheaths keeled, glabrous, the margins papillose-ciliate at least toward the summit; blades 3–15 cm. long, 2–6 mm. wide, abruptly acute, the margins sparsely papillose-ciliate; racemes 2, conjugate, rarely 3, 3–7 cm. long, slender, narrowly ascending to spreading; spikelets 2–2.5 mm. long, ovate, less shining than those of *P. notatum*.

Open grassy slopes, savannas, and dry fields, Central Mexico and the West Indies to Paraguay and Bolivia.

CHIRIQUÍ: Cerro Vaca, *Pittier* 5345; Bajo Boquete, *Killip* 4582; El Boquete, *Hitchcock* 8234. CANAL ZONE: Gatún, *Hitchcock* 7973, 7978; Ancón Hill, *Standley* 26355; *Killip* 4027. PANAMÁ: Chorrera, *Hitchcock* 8123; Chepo, *Pittier* 4624.

11. *PASPALUM SUBCILIAM* Chase, Jour. Washington Acad. Sci. 17:144. f. 1. 1927.

Perennial; culms in dense tufts, 15–45 cm. high, erect from short knotty rhizomes, the bases somewhat swollen; sheaths glabrous or the margins ciliate toward the summit, the lower ones short and crowded, the lowermost scale-like, the uppermost elongate, bladeless; ligule 0.5 mm. long, ciliate; blades 5–20 cm. long, 2–5 mm. wide, attenuate, more or less involute, long-pilose on the upper surface near the base; racemes 2, conjugate, sometimes with a third a short distance below, 3–6.5 cm. long, narrowly ascending or spreading, the rachis narrow, flexuous, densely pilose at the usually naked base; spikelets 2.2–2.4 mm. long, solitary, elliptic, subacute; glume and sterile lemma equal, pointed beyond the fruit, the glume pubescent or pilose, the hairs longer on the margins, the lemma glabrous or with a few hairs on the margins; fruit about 2 mm. long, yellowish, minutely striate.

Open savannas, Panama and Brazil.

CHIRIQUÍ: Dolega, *Hitchcock* 8339. CANAL ZONE: Balboa, *Hitchcock* 8017 (TYPE). PANAMÁ: Chepo, *Pittier* 4500.

12. *PASPALUM LINEARE* Trin. Gram. Pan. 99. 1826.

*Paspalum angustifolium* Nees, Agrost. Bras. 64. 1829.



*Paspalum neesii* Kunth, Rév. Gram. 1:25. 1829.

*Panicum furcellatum* S. Moore, Trans. Linn. Soc. London Bot. II. 4:505. *pl.* 34. *f.* 14-22. 1895.

Perennial; culms densely tufted, erect, 40–80 cm. high, the nodes densely pilose with ascending hairs; lower sheaths crowded, becoming fibrous with age, keeled, sparsely to rather densely ascending-pilose toward the summit, the upper ones elongate, nearly bladeless, glabrate; ligule membranaceous, very short; blades conduplicate, 5–50 cm. long, 0.5–1.5 mm. wide as folded, erect or nearly so, densely pilose on the upper surface at the base; racemes 2 or rarely 3, approximate, 3–5.5 cm. long, the rachis narrowly winged, flexuous, densely pilose at the base; spikelets 4–4.5 mm. long, solitary, scarcely imbricate, with a short tuft of hairs on either side at the base; glume and sterile lemma equal, firm, pointed beyond the fruit; fruit 3.8–4.3 mm. long, pale, blunt, minutely striate, roughened.

Savannas, Costa Rica and Cuba to Argentina.

CHIRIQUÍ: Boquete District, *Davidson* 833.

13. *PASPALUM PROPINQUUM* Nash, Bull. N. Y. Bot. Gard. 1:291. 1899.

Perennial; culms densely tufted, erect from short knotty rhizomes, 15–75 cm. high, with terminal and axillary inflorescences; sheaths glabrous or pilose, the margins ciliate, the lower ones rather short, overlapping, the upper one distant, elongate; blades mostly 5–15 cm. long, rarely more than 25 cm., 4–10 mm. wide, rounded at the base, glabrous on both surfaces, the margins sparsely papillose-ciliate; racemes 1–3, erect to arcuate-spreading, 4–8 cm. long; spikelets paired, 1.7–1.9 mm. long, elliptic-obovate, slightly pointed, glabrous or sparsely pubescent with capitate hairs.

Open sandy ground, Florida, Mexico (Veracruz) and the West Indies to Panama.

PANAMÁ: Panamá, *Hitchcock* 8099; Point Chamé, *Hitchcock* 8165.

14. *PASPALUM DECUMBENS* Swartz, Prodr. Veg. Ind. Occ. 22. 1788.

*Paspalum pedunculatum* Poir. in Lam. Encycl. Suppl. 4:315. 1816.

*Panicum decumbens* Roem. & Schult. Syst. Veg. 2:429. 1817.

*Paspalum vaginiflorum* Steud. Syn. Pl. Glum. 1:19. 1854.

*Dimorphostachys pedunculata* Fourn. Mex. Pl. 2:15. 1886.

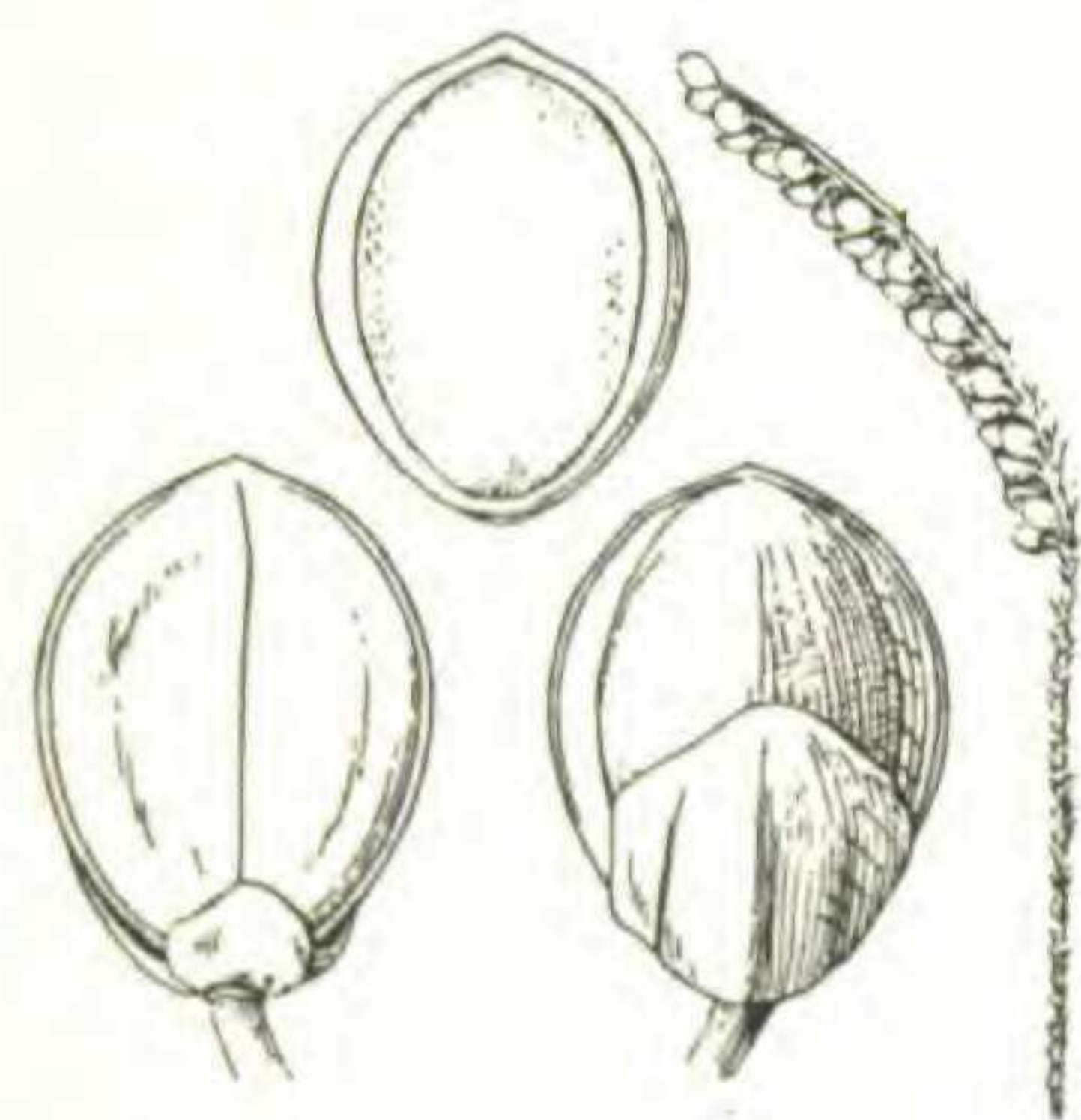


Fig 19  
*Paspalum decumbens*

Perennial, sometimes appearing almost like an annual; culms 10–70 cm. long, freely branching, erect or usually decumbent-spreading, the ends ascending, often rooting at the lower, more or less pubescent or pilose nodes; sheaths about as long as or a little shorter than the internodes, compressed, keeled, papillose-pilose to nearly glabrous, the margins densely ciliate; ligule membranaceous, about 0.5 mm. long; blades 2–15 cm. long, usually 5–10 cm., 6–12 mm. wide, rounded at the base, acuminate, softly pubescent on both surfaces or glabrous with a few scattered stiff hairs, the margins papillose-



ciliate; peduncles 2–8 from the upper sheaths, slender, usually elongate; racemes solitary, 1–3.5 cm. long, arcuate; rachis very narrow, pubescent at the base; spikelets paired, 1.7 mm. long, obovate, glabrous, the first glume developed; second glume obtuse, about half as long as the spikelet; fruit as long as the sterile lemma, pale, minutely striate.

Open or brushy banks, woods, and thickets, often a weed in waste ground, Guatemala and the West Indies to Brazil and Bolivia.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart 180*. CHIRIQUÍ: David, *Hitchcock 8361*; San Felix, *Pittier 5185, 5752*. COLÓN: Permé, G. Proctor Cooper III 270; Cativeal, *Standley 30274*. CANAL ZONE: Barro Colorado Island, *Kenoyer 128*; Obispo, *Standley 31662*; Culebra, *Hitchcock 7939, 8115*; between Pedro Miguel and Corozal, *Hitchcock 7990*; Balboa, *Standley 29299*. PANAMÁ: Chorrera, *Hitchcock 8141*; Taboga Island, *Hitchcock 8088*.

15. *PASPALUM NUTANS* Lam. Tabl. Encycl. 1:175. 1791.

*Paspalum curvistachyum* Raddi, *Agrost. Bras.* 26. 1823.

*Paspalum protensum* Trin. *Gram. Pan.* 108. 1826.

*Paspalum singulare* Link, *Hort. Berol.* 1:48. 1827.

*Paspalum heteropodium* Steud. *Syn. Pl. Glum.* 1:19. 1854.

*Paspalum boivini* Steud. *Syn. Pl. Glum.* 1:416. 1855.

*Paspalum lloydii* Nash, *N. Amer. Fl.* 17:178. 1912.

Perennial; culms 25–90 cm. long, erect from a decumbent base, spreading or creeping, freely branching, rooting at the lower nodes; sheaths shorter than the internodes or the lower ones overlapping, compressed, keeled, glabrous, the margins usually ciliate; ligule membranaceous, 1–1.5 mm. long; blades 4–16 cm. long, 5–15 mm. wide, lanceolate, acuminate, rounded at the base, glabrous or pubescent with a few coarse hairs on the upper surface at the base, the margins scabrous and often more or less papillose-ciliate; peduncles 1–4 from the terminal sheaths, finally elongate; racemes 1–5, 2–6 cm. long, arcuate, the rachis narrow, glabrous, slightly flexuous, with a few long hairs at the base; spikelets paired, 1.8–2 mm. long, obovate, glabrous, the first glume usually obsolete, the second glume obtuse, about three-fourths as long as the spikelet; fruit as long as the sterile lemma, pale, striate.

Shady banks, along streams, and moist thickets, Honduras and the Leeward Islands to Brazil; also on the island of Mauritius.

CHIRIQUÍ: El Boquete, *Hitchcock 8230*; San Felix, *Pittier 5753*. CANAL ZONE: Toro Point, *Hitchcock 8047*; Balboa, *Standley 25445, 26049*; Sabana de Marcelito, *Pittier 2381*. PANAMÁ: Río Chagres, *Dodge & Allen 17352, 17412*; Juan Díaz, *Killip 4125*; Chepo, *Pittier 4719*.

16. *PASPALUM PILOSUM* Lam. Tabl. Encycl. 1:175. 1791.

*Panicum monostachyum* H.B.K. *Nov. Gen. & Sp.* 1:96. 1815.

*Panicum monobotrys* Trin. ex Steud. *Syn. Pl. Glum.* 1:55. 1854.

*Panicum monostachyum* var. *a. robustius* Doell in *Mart. Fl. Bras.* 2<sup>2</sup>:182. 1877.

*Panicum monostachyum* var. *minus* Kunth ex Doell in *Mart. Fl. Bras.* 2<sup>2</sup>:182. 1877.

*Dimorphostachys monostachya* Fourn. *Mex. Pl.* 2:14. 1886.

*Dimorphostachys pilosa* Fourn. *Mex. Pl.* 2:14. 1886.

Perennial; culms 40–115 cm. high, erect or ascending, simple or sparingly



branched from the middle nodes, the nodes densely short-pubescent or nearly glabrous; sheaths shorter than the internodes, keeled, from glabrous to papillose-pilose, hairy on the collar, the margins rather densely ciliate; ligule membranaceous, 1–1.5 mm. long; blades 10–40 cm. long, 3–10 mm. wide, stiff, somewhat spreading, densely pilose on both surfaces, the hairs rather stiff, the margins scabrous; peduncles 1–4 from the upper and middle sheaths, elongate or almost included; racemes solitary, 6–17 cm. long, arcuate, the rachis narrowly winged, the margins scabrous, more or less ciliate; spikelets paired, crowded, 2.6–3 mm. long, elliptic, glabrous; first glume small or as much as half as long as the spikelet, rarely obsolete; second glume and sterile lemma firm, subequal, or the second glume a little shorter, exposing the fruit, the lemma enclosing a palea and sometimes a staminate flower; fruit about 2.5 mm. long, striate.

Savannas, thickets, and grassy slopes, usually in moist soil, Costa Rica to Bolivia and southern Brazil.

CHIRIQUÍ: David, *Hitchcock* 8365; Cerro Vaca, *Pittier* 5325, 5364; El Boquete, *Hitchcock* 8192, 8298; Bajo Boquete, *Killip* 4558. CANAL ZONE: between Pedro Miguel and Corozal, *Hitchcock* 7988; Ancón, *Killip* 4011; *Standley* 25205. PANAMÁ: Chorrera, *Hitchcock* 8130.

17. *PASPALUM PANICULATUM* L. *Syst. Nat.* ed. 10. 2:855. 1759.

*Paspalum hemisphericum* Poir. *Encycl.* 5:31. 1804.

*Paspalum strictum* Pers. *Syn. Pl.* 1:86. 1805.

*Paspalum compressicaule* Raddi, *Agrost. Bras.* 29. 1823.

*Paspalum supinum* Rupr. ex Galeotti, *Bull. Acad. Sci. Brux.* 9:237. 1842. Not *P. supinum* Bosc.

*Paspalum multispica* Steud. *Syn. Pl. Glum.* 1:18. 1854.

*Paspalum affine* Bello, *Anal. Soc. Españ. Hist. Nat.* 12:125. 1883. Not *P. affine* Steud., 1854.

*Paspalum paniculatum*  $\beta$ . *rigidum* Schlecht. ex Fourn. *Mex. Pl.* 2:9. 1886.

*Paspalum cordovense* Fourn. *Mex. Pl.* 2:9. 1886.

*Paspalum galmarra* F. M. Bailey, *Dept. Agr. Brisbane Bot. Bull.* 9:12. 1894.

*Paspalum paniculatum* var. *minor* S. Moore, *Trans. Linn. Soc. Bot. II.* 4:503. 1895.

*Panicum paniculatum* Kuntze, *Rév. Gen. Pl.* 3<sup>3</sup>:363. 1898.

*Paspalum paniculatum minor* Scribn. *Field. Mus. Bot.* 2:24. 1900.



Fig. 20. *Paspalum paniculatum*

Perennial; culms densely tufted, 0.3 to more than 2 m. high, coarse, leafy, erect or ascending, sometimes decumbent at the base and rooting at the lower nodes, finally branching, the nodes glabrous to conspicuously bearded with stiff ascending hairs; sheaths mostly longer than the internodes, keeled, papillose-hispid, sometimes only on the collar and along the margins, colored orange-brown on the inner



surface; ligule 1–3 mm. long; blades 9–50 cm. long, 6–25 mm. wide, usually rounded at the base, densely hispid on both surfaces to nearly glabrous, with a tuft of long hairs on each side at the base, the margins scabrous, more or less hispid-ciliate; inflorescence 5–30 cm. long, composed of 7–60 approximate, solitary or somewhat fascicled racemes, the lower ones 4–12 cm. long, ascending or arcuate-spreading; spikelets paired, 1.3–1.5 mm. long, densely crowded, the glume and sterile lemma equal, barely covering the fruit, softly pubescent, the sterile lemma woolly pubescent only on the margins; fruit about as large as the spikelet, smooth and shining.

Moist open ground, brushy slopes, forests, fields, and waste places, Mexico and the West Indies to Argentina; also in west Africa, the Society Islands, and Queensland, Australia.

BOCAS DEL TORO: Almirante, *Cooper 124*; Laguna de Chiriquí, *Hart 65*; *von Wedel 1120*; Water Valley, *von Wedel 1761*; Bocas del Toro, *Carleton 182*. CHIRIQUÍ: David, *Hitchcock 8349*; El Boquete, *Hitchcock 8272*; *Pittier 3041*. COLÓN: Permé, *Cooper III 223*. CANAL ZONE: Frijoles, *Piper 5201*; Barro Colorado Island, *Standley 40953*; Darién Station, *Standley 31508, 31529*; Culebra, *Hitchcock 7907*; *Standley 25997*; Summit, *Standley 25813, 26966, 27314, 27328*; Ancón, *Killip 4112*; *Pittier 6767*; Balboa, *Macbride & Featherstone 43*; *Killip 4329*. PANAMÁ: Corozal Road, *Standley 26820*; Taboga Island, *Hitchcock 8071*; *Standley 27953*.

18. *PASPALUM MULTICAULE* Poir. in Lam. Encycl. Suppl. 4:309. 1816.

*Paspalum papillosum* Spreng. Nov. Prov. Hal. 47. 1819.

Annual; culms slender, densely tufted, freely branching from the lower nodes, ascending or spreading, mostly 10–30 cm. high, sometimes depauperate or rarely as much as 60 cm. tall; sheaths usually longer than the internodes, keeled, glabrous or more or less pilose, the margins often ciliate, especially toward the summit; blades 2–15 cm. long, 1.5–2.5 mm. wide, from nearly glabrous to densely short-pubescent, usually papillose-pilose as well; racemes 2, rarely 1 or 3, conjugate, divergent, 1.5–6 cm. long; spikelets 1.2–1.5 mm. long, subhemispheric, solitary, from glabrous to rather densely beaded with subglobular hairs; second glume and sterile lemma equal, covering the fruit, or the glume rarely reduced or wanting; fruit about the size of the spikelet, minutely striate.

Moist places in savannas, roadsides, and open ground, southern Mexico and Trinidad to Brazil and Bolivia.

CHIRIQUÍ: San Felix, *Pittier 5149*. COCLÉ: Aguadulce, *Pittier 4866, 4871*. CANAL ZONE: between Panamá and Corozal, *Hitchcock 9188, 9197½*. PANAMÁ: Chepo, *Pittier 4515, 4622*; between Panamá and Chepo, *Dodge, Hunter, Steyermark & Allen 16692*.

19. *PASPALUM CLAVULIFERUM* Wright, Anal. Acad. Cienc. Habana 8:203. 1871; Fl. Cub. 195. 1873.

*Paspalum falcula* Doell in Mart. Fl. Bras. 2<sup>2</sup>:60. 1877.

*Paspalum pittieri* Hack. ex Beal, Grasses N. Amer. 2:88. 1896.

Annual; culms 5–45 cm. high, slender, tufted, erect to spreading, branching at the lower nodes; sheaths mostly overlapping, or shorter than the internodes in taller plants, papillose-hispid, sometimes with only a few hairs near the margins



toward the summit; ligule 0.5–1 mm. long; blades 3–16 cm. long, 1.5–4 mm. wide, ascending, sparsely to rather densely papillose-hispid, especially along the midnerve and on the margins; racemes solitary or paired, 1–5.5 cm. long, arcuate, long-exserted, the rachis slender, straight or somewhat flexuous; spikelets 1.1–1.5 mm. long, paired, elliptic or obovate, usually sparsely to densely pubescent with delicate capitate hairs, rarely glabrous, the second glume and sterile lemma equal or the glume a little shorter; fruit a little smaller than the spikelet, elliptic rather than obovate, striate.

Moist places in savannas, open or brushy slopes, and waste places, southern Mexico, and the West Indies to Colombia and Brazil.

CANAL ZONE: Madden Dam, *Bartlett & Lasser 16798*. PANAMÁ: Chepo, *Pittier 4525*.

20. *PASPALUM PARVIFLORUM* Rohde ex Flügge, *Monogr. Pasp.* 98. 1810.

*Paspalum parviflorum* var. *humile* Nees ex Doell in *Mart. Fl. Bras.* 2<sup>2</sup>:45. 1877.

Annual; culms slender, densely tufted, 4–17 cm. high, ascending or spreading, branching from the lower and middle nodes; sheaths mostly longer than the internodes, sparsely to rather densely papillose-pilose; ligule about 0.2 mm. long; blades 1.5–6.5 cm. long, 1–2 mm. wide, flat or loosely folded, flexuous, subattenuate, mostly conspicuously papillose-pilose with long fine hairs; racemes 1–4, stiffly spreading or reflexed, 6–26 cm. long, the rachis strongly zigzag, angular, scabrous on the angles, naked for a short space at the base; spikelets about 0.8 mm. long, solitary, oblong-elliptic, the second glume and sterile lemma thin with raised, somewhat thickened margins; fruit about as large as the spikelet, smooth and shining.

Dry savannas, Panama and Puerto Rico to Brazil.

PANAMÁ: Orange River, *Killip 4260*.

21. *PASPALUM STANDLEYI* Chase, *Jour. Washington Acad. Sci.* 17:146. 1927.

Perennial; culms 20–27 cm. high, slender, tufted, spreading, sometimes rooting at the lower nodes, glabrous or sparsely pilose below the nodes, these bearded with ascending hairs; sheaths overlapping, keeled, pilose or papillose-pilose, especially on the collar and along the margins; ligule about 0.2 mm. long; blades 3–6 cm. long, 3–6 mm. wide, the uppermost much reduced, acute, pilose or papillose on the lower surface, papillose or nearly glabrous on the upper; racemes 2–4, 2.2–4 cm. long, ascending or spreading, the rachis narrowly winged, about 0.8 mm. wide, terminated by a spikelet; spikelets 1.6 mm. long, solitary, narrowly obovate, sub-acute, glabrous, the glume and sterile lemma somewhat exceeding the fruit, the sterile lemma obscurely cross-wrinkled; fruit 1.5 mm. long, pale.

Marshy thickets, Panama.

PANAMÁ: Juan Díaz, *Standley 30543* (TYPE).

22. *PASPALUM MICROSTACHYUM* Presl, *Rel. Haenk.* 1:215. 1830.

*Paspalum effusum* Nees, *Jour. Bot. Kew Misc.* 2:104. 1850. Not *P. effusum* Rasp., 1825.  
*Paspalum cognatissimum* Steud. *Syn. Pl. Glum.* 1:18. 1854.



Annual; culms slender, 20–135 cm. high, erect from a geniculate base, sometimes rooting at the lower nodes, branching at the lower and middle nodes; sheaths mostly much shorter than the internodes, keeled, glabrous to papillose-pilose; ligule about 0.3 mm. long; blades 3–30 cm. long, 6–20 mm. wide, thin, the lower tapering to a narrow base, the upper ones rounded to cordate, glabrous to papillose-pilose on both surfaces, the margins scabrous, papillose-ciliate toward the base; panicles terminal and axillary, composed of 6–35 slender, solitary or fascicled, ascending or arcuate-spreading racemes, the lower ones 3–8 cm. long, rather distant, the upper ones gradually approximate and shorter; rachis narrowly winged, 0.5–0.6 mm. wide, with scattered long white hairs on the margins; spikelets 1.5–1.6 mm. long, paired, on long slender pedicels, elliptic, subacute, the glume and sterile lemma equal, thin, softly and rather densely pubescent; fruit 1.5 mm. long, smooth and shining.

Moist thickets, roadsides, and waste places, Guatemala to Ecuador and Brazil.

BOCAS DEL TORO: Peach Creek, *von Wedel 2694*. CHIRIQUÍ: David, *Hitchcock 8348*. CANAL ZONE: Gamboa, *Pittier 4436*; Culebra, *Hitchcock 8025*; Las Cruces Trail, *Standley 29142*; Ancón, *Killip 4006*; Balboa, *Standley 25292, 26105*; *Hitchcock 8011*. PANAMÁ: Matías Hernández, *Pittier 6789*; Chepo, *Pittier 4462*; Chorrera, *Hitchcock 8151*; Taboga Island, *Hitchcock 8069*; *Standley 27083*.

23. *PASPALUM ORBICULATUM* Poir. in Lam. Encycl. 5:32. 1804.

*Paspalum pusillum* Vent. ex Flüge, Monogr. Pasp. 100. 1810.

*Paspalum serpens* Presl ex Trin. Gram. Pan. 102. 1826.

*Paspalum geniculatum* Steud. Syn. Pl. Glum. 1:18. 1854. Not *P. geniculatum* Raf., 1817.

*Paspalum lenormandi* Husn. Enum. Glum. 12. 1871.

Stoloniferous perennial; culms 10–60 cm. long, slender, creeping, rooting at the nodes, the ascending branches 10–25 cm. long, the internodes usually short, the nodes glabrous or appressed-pubescent; sheaths usually shorter than the internodes, compressed, glabrous, the margins ciliate toward the summit; blades 1–6 cm. long, 1.5–7 mm. wide, spreading, glabrous or minutely pubescent; racemes 2–7, approximate, ascending or spreading, 1–2, or rarely 3, cm. long, the rachis narrowly winged, 0.5–0.8 mm. wide, the peduncle included or short-exserted; spikelets 1–1.2 mm. long, ovoid, minutely pointed, glabrous or rarely pubescent, greenish-golden, the margins of the sterile lemma somewhat raised; fruit 0.9–1 mm. long, smooth and shining, chestnut-brown.

Moist sandy banks, open ground, and along streams and ditches, southern Mexico and the West Indies to Paraguay.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart 92*. COLÓN: Fató, *Pittier 4147*; Catival, *Standley 30432*. CANAL ZONE: Frijoles, *Hitchcock 8389*; between Gorgona and Tabernilla, *Hitchcock 7966*; Bohio, *Pittier 3426*. PANAMÁ: Chepo, *Pittier 4613*.

24. *PASPALUM JIMENEZII* Chase, Contr. U. S. Nat. Herb. 28:159. f. 101. 1929.

Perennial; culms 10–30 cm. long, in small rather loose tufts, erect or decumbent at the base, rooting and branching at the lower nodes, the nodes glabrous or sparsely appressed-pubescent; sheaths compressed, hairy on the collar, the margins glabrous or ciliate, especially toward the summit; blades 2.5–9 cm. long, 2–5 mm.



wide, rounded at the base, glabrous or with a few hairs on the upper surface near the base; racemes 2-8, ascending or spreading, 1.5-5 cm. long, the rachis narrowly winged, about 0.8 mm. wide; spikelets 1.3-1.7 mm. long, elliptic or ovate-elliptic, subacute, glabrous, the glume and sterile lemma equal, pointed beyond the fruit, thin; fruit 1.1-1.5 mm. long, pale or brownish.

Sandy banks of rivers and streams, Costa Rica and Panama.

PANAMÁ: between Peluca Hydrographic Station and Quebrada Peluca along Río Boquerón, *Steyermark & Allen 17239*.

25. *PASPALUM HITCHCOCKII* Chase, Contr. U. S. Nat. Herb. 28:160. *f. 102*. 1929.

Perennial; culms 5-50 cm. long, creeping, rooting at the lower nodes, compressed, glabrous; the ascending branches 12-30 cm. high, nodes glabrous or appressed-pubescent; sheaths longer or shorter than the internodes, compressed, glabrous or with a few hairs at the throat; ligule membranaceous, about 0.3 mm. long; blades 5-13 cm. long, 4-9 mm. wide, flat, somewhat rounded at the base, glabrous; racemes 2-3, exserted or partly included, erect or ascending, rather thick, 1.5-4 cm. long, the rachis narrowly winged, 1-1.5 mm. wide, glabrous; spikelets 1.7-1.8 mm. long, depressed-hemispheric, the pedicels flat; glume and sterile lemma equal, thin, loose, irregularly wrinkled, glabrous; fruit about 1.6 mm. long, reddish-brown, smooth and shining.

Margins of lagoons and ponds, Panama and Colombia.

PANAMÁ: Chepo, *Pittier 4632*.

26. *PASPALUM CONJUGATUM* Bergius, Act. Helv. Phys. Math. 7:129. *pl. 8*. 1762.

*Paspalum tenue* Gaertn. f. Fruct. & Sem. 2:2. *pl. 80*. 1791.

*Paspalum ciliatum* Lam. Tabl. Encycl. 1:175. 1791.

*Paspalum africanum* Poir. in Lam. Encycl. Suppl. 4:314. 1816.

*Paspalum renggeri* Steud. Syn. Pl. Glum. 1:17. 1854.

*Paspalum sieberianum* Steud. Syn. Pl. Glum. 1:17. 1854.

*Paspalum longissimum* Hochst. ex Steud. Syn. Pl. Glum. 1:19. 1854.

*Paspalum conjugatum* var. *parviflorum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:55. 1877.

*Paspalum conjugatum* var. *tristachyum* Vandery. Bull. Agric. Congo Belge 9:245. 1918.

Stoloniferous perennial; culms as much as 2 m. long, but usually less than 1 m., often decumbent at the base and rooting at the lower nodes, simple or sparingly branched; stolons long, leafy, with erect or ascending flowering branches, the nodes usually conspicuously pilose; culm sheaths loose, compressed, pubescent on the collar, the margins ciliate, those of the stolons short and broad; blades mostly 8-12 cm. long, 5-15 mm. wide, thin, glabrous or sometimes pubescent, the margins scabrous or short-ciliate; racemes 2, conjugate, widely spreading, 4-15 cm. long; spikelets 1.4-2.2 mm. long, ovate, minutely pointed, the margins of the glume papillose-ciliate with long fine hairs.

A common weed, roadsides, waste ground along rivers and ditches and in cultivated ground, Florida to Texas, Mexico and the West Indies to Argentina; also in the Eastern Hemisphere.

BOCAS DEL TORO: *Carleton 171*. CHIRIQUÍ: El Boquete, *Hitchcock 8193*. COLÓN: Río Indio de Fató, *Pittier 4260*; Porto Bello, *Pittier 2444, 2480*. SAN BLAS: Puerto Obaldía,



*Pittier 4314*. CANAL ZONE: Barro Colorado Island, *Bailey & Bailey 550, 646*; Culebra, *Hitchcock 7909*; *Pittier 2084, 3435, 3436*; Balboa, *Standley 25463, 25651*. PANAMÁ: Río La Maestra, *Allen 1*. DARIÉN: Boca de Cupe, *Allen 886*.

*PASPALUM CONJUGATUM* var. *PUBESCENS* Doell in Mart. Fl. Bras. 2<sup>2</sup>:55. 1877.

Differs from the species in being usually stouter, with longer blades 15–25 cm. long, and larger spikelets 1.7–2.2 mm. long, the cilia more conspicuous than in the species.

Ditches, banks, and in waste ground, Mexico and the Lesser Antilles to Brazil.  
BOCAS DEL TORO: Laguna de Chiriquí, *Hart 81*.

27. *PASPALUM FASCICULATUM* Willd. ex Flüge, Monogr. Pasp. 69. 1810.

*Paspalum vaginatum* var. *pleostachyum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:75. 1877.

*Paspalum fasciculatum* var. *glabratus* Doell in Mart. Fl. Bras. 2<sup>2</sup>:91. 1877.

Coarse stoloniferous perennial; culms as much as several meters long and 1 cm. thick, long decumbent-spreading, rooting at the lower nodes, usually forming tangled masses; stolons as much as 5 m. long with erect sparingly branching flowering culms 0.7–2 m. tall; nodes glabrous to densely bearded; sheaths rather loose, about as long as the relatively short internodes, nearly glabrous, the margins densely ciliate; ligule firm, about 0.7 mm. long; blades 20–60 cm. long, 1.2–3 cm. wide, acuminate, glabrous to sparsely papillose-pilose, the margins very scabrous; inflorescence flabellate, composed of 7–30 ascending to spreading racemes, 7–17 cm. long,

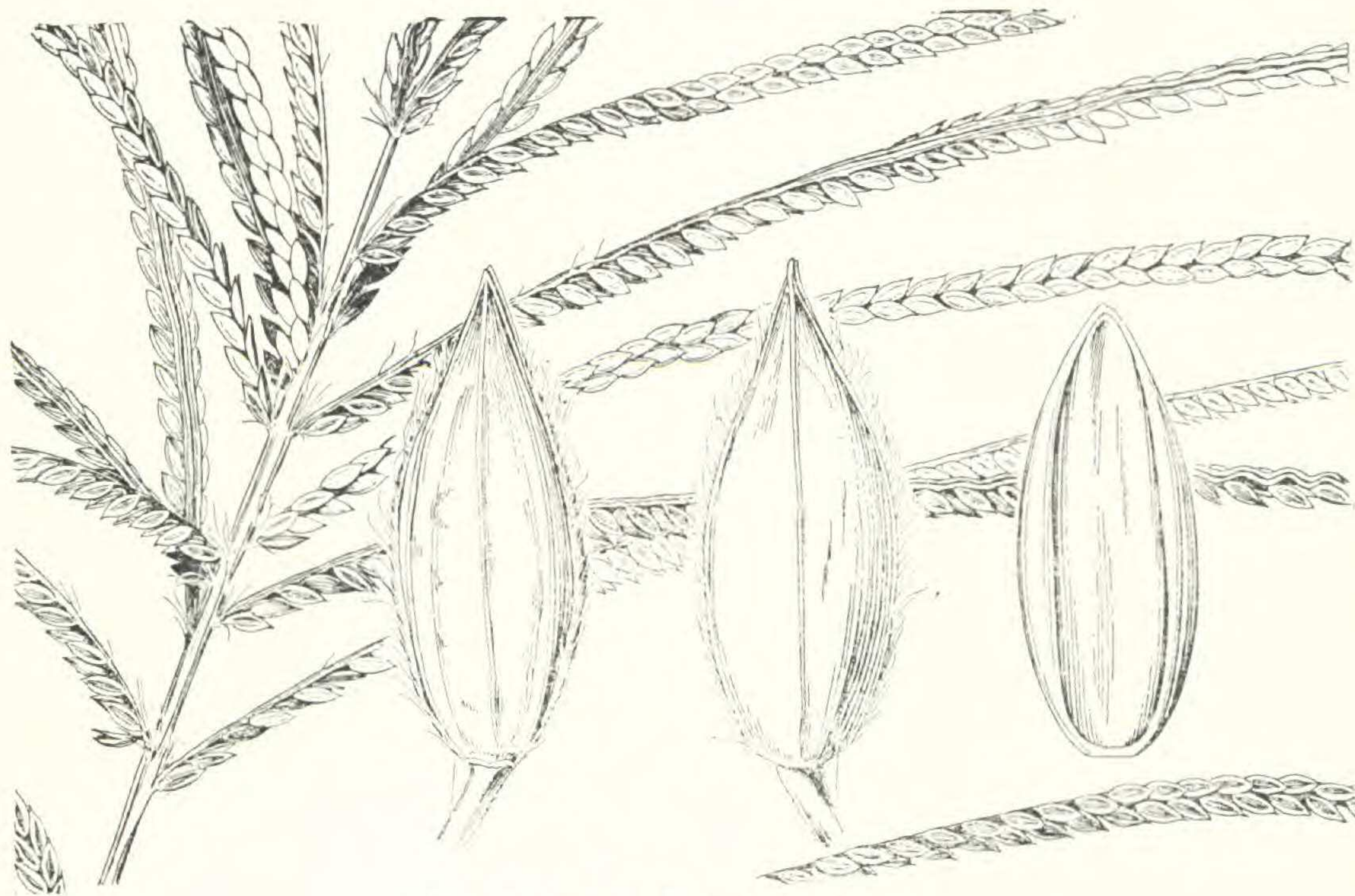


Fig. 21. *Paspalum fasciculatum*



aggregate on a rather short stout axis; spikelets 4–5 mm. long, solitary, imbricate, elliptic, abruptly acuminate, the first glume often developed; second glume and sterile lemma equal, pointed beyond the fruit, glabrous, or the margins usually silky-ciliate; fruit 3.7–3.8 mm. long, light brown, smooth and shining.

Margins of rivers and streams, swamps and low ground, southern Mexico to Ecuador and Argentina.

BOCAS DEL TORO: Changuinola Valley, *Dunlap 199*. CANAL ZONE: New Frijoles, *Pittier 6841*; between Frijoles and Monte Lirio, *Killip 12125*; Matachín, *Pittier 4435*; Trinidad River, *Pittier 4020*; Culebra, *Hitchcock 7899*; Juan Mina, *Bartlett & Lasser 16881*; Corozal, *Piper 5215*.

28. *PASPALUM VIRGATUM* L. Syst. Nat. ed. 10. 2:855. 1759.

*Paspalus virgatus*  $\alpha$ . *linneanus* Flüggé, Monogr. Pasp. 189. 1810.

*Paspalus virgatus*  $\gamma$ . *jacquinianus* Flüggé, Monogr. Pasp. 190. 1810.

*Paspalus virgatus*  $\delta$ . *willdenowianus* Flüggé, Monogr. Pasp. 190. 1810.

*Paspalum virgatum* var. *stramineum* Griseb. Fl. Brit. W. Ind. 543. 1864.

*Paspalum leucocheilum* Wright, Anal. Acad. Cienc. Habana 8:203. 1871; Fl. Cub. 194. 1873.

*Panicum lagascae* var. *virgatum* (L.) Kuntze, Rev. Gen. Pl. 3<sup>3</sup>:362. 1898.

Coarse leafy perennial; culms in large dense clumps, 1–2 m. high, erect, simple; sheaths longer than the internodes, glabrous or sparsely hirsute on the collar and along the margins, the upper keeled, the lower ones spongy, reticulate, purplish; ligule 1.5–2 mm. long; blades 30–75 cm. long, 1–2 cm. wide, firm, flat, the margins serrulate; inflorescence 12–40 cm. long, composed of few to many thick ascending to drooping racemes, the lower ones mostly 10–15 cm. long, rarely 20 cm. long; rachis 1–1.5 mm. wide with a tuft of long hairs at the base, the margins very scabrous; spikelets 2.2–3 mm. long, paired, crowded, obovate, abruptly pointed, with silky hairs on the margins especially toward the summit, otherwise glabrous to pubescent; fruit 2–2.2 mm. long, chestnut-brown, striate.

Moist open ground and brushy slopes, Texas, Mexico, and the West Indies to Brazil.

CANAL ZONE: Ancón, *Pittier 6768*; *Standley 26338*; Obispo, *Standley 31784*; Gamboa, *Standley 28456*; Empire, *Piper 3724, 5199*; Culebra, *Hitchcock 7903*; *Pittier 2079*; Pedro Miguel, *Allen 7*; Madden Dam, *Bartlett & Lasser 16773*; Corozal, *Piper 5203*; *Standley 26882*. PANAMÁ: Arraiján, *Woodson, Allen & Seibert 1381*; Chepo, *Pittier 4647, 4693*; Taboga Island, *Hitchcock 8082*; *Pittier 3604*.

29. *PASPALUM ACUTUM* Chase, Jour. Washington Acad. Sci. 17:146. f. 4. 1927.

Perennial; culms 1–2 m. high, erect, simple, leafy to the summit; sheaths much longer than the internodes, compressed, papillose-hispid in the throat and on the margins toward the summit; ligule 1.5–2 mm. long; blades 35–75 cm. long, 14–18 mm. wide, the uppermost greatly reduced, narrowed toward the base, acuminate, glabrous on the lower surface, sparsely pubescent or pilose on the upper, the margins sharply serrate; panicle scarcely exerted, composed of 6–10 heavy ascending or drooping racemes 8–12 cm. long, the axis 5–15 cm. long; rachis 1–1.5 mm. wide with a tuft of long hairs at the base, the margins serrate; spikelets 3.5–3.9 mm. long, paired, closely imbricate, abruptly acute; glume and sterile lemma equal,



pointed beyond the fruit, the glume obscurely to rather prominently silky-ciliate toward the summit, otherwise glabrous or obscurely pubescent, the sterile lemma glabrous; fruit 3 mm. long, elliptic, pale, minutely striate.

Low open ground and along ditches, Mexico (Veracruz) and Panama to northern Brazil.

CANAL ZONE: Ancón, Killip 4003 (TYPE).

30. *PASPALUM DENSUM* Poir. in Lam. Encycl. 5:32. 1804.

*Paspalum paniceum* Smith in Rees' Cycl. 26: no. 14. 1813.

Perennial; culms 0.8–2 m. high, robust, thick and succulent at the base, compressed, the nodes glabrous to densely appressed-hirsute; sheaths much longer than the internodes, keeled, broad and loose, glabrous or hirsute on the collar, the margins sometimes ciliate toward the summit, the lower ones equitant, purplish, spongy, reticulate in drying; ligule 1.5–3 mm. long; blades 50–100 cm. long, 1–2 cm. wide, firm, folded at the base, long-acuminate, glabrous with a few hairs just above the ligule, the margins sharply serrate; panicles 12–40 cm. long, rather narrow, tapering, dense, composed of 50–100 crowded, finally spreading racemes, the lower ones 5–9 cm. long with conspicuous tufts of hairs in the axils; rachis 1.2–1.5 mm. wide, sharply serrate, the margins papillose-ciliate with rather stiff hairs 2–5 mm. long; spikelets 1.9–2.2 mm. long, paired, on slender scabrous pedicels, suborbicular or obovate, sometimes tinged with purple; glume and sterile lemma equal, thin, glabrous; fruit covered or slightly exposed, 1.8 mm. long, pale, minutely striate.

Marshes, wet savannas and wet open ground, the West Indies and Panama to Bolivia and Brazil.

COCLÉ: between Aguadulce and Antón, Woodson, Allen & Seibert 1213. CANAL ZONE: Fort Kobe road, Woodson, Allen & Seibert 1422; Corozal, Killip 4106; Balboa, Hitchcock 8020. PANAMÁ: Chepo, Pittier 4646.

31. *PASPALUM CORYPHEUM* Trin. Gram. Pan. 114. 1826.

*Paspalum pruinatum* Trin. Gram. Icon. 3: pl. 272. 1836.

*Paspalum familiare* Steud. Syn. Pl. Glum 1:24. 1854.

*Paspalum violascens* Mez, Repert. Sp. Nov. (Fedde) 15:73. 1917.

Perennial; culms in tough clumps from short hard rhizomes, 1–4 m. high, slender or robust, glabrous to densely papillose-hispid at least below the glabrous to conspicuously bearded nodes, finally branching, the branches slender, leaning or drooping; sheaths mostly longer than the internodes, the lower ones usually papillose-hispid, the upper ones glabrous or only sparsely papillose-hispid, the margins sometimes ciliate toward the summit; ligule firm, 1–3 mm. long; blades 12–32 cm. long, 8–23 mm. wide, rounded at the base, glabrous or scaberulous, sometimes sparsely pubescent or pilose with a dense line of long hairs just above the ligule, the margins scabrous; panicles nodding or drooping, composed of 10–45 racemes spreading or recurved at maturity, the lower 6–14 cm. long, the axis 10–25 cm. long, glabrous or sparsely pilose; rachis about 0.5 mm. wide, scabrous, densely hairy in the axils, sometimes naked at the base; spikelets 2–2.5 mm. long, elliptic,



paired, usually loosely arranged toward the base of the racemes, denser above; glume and sterile lemma equal, scarcely covering the fruit, finely pubescent or especially the lemma nearly glabrous; fruit pale, shining, very minutely striate.

Savannas, brushy slopes, river banks, and wood borders, Panama and Trinidad to Brazil.

PANAMÁ: Chagres Valley, *Pittier* 3478.

32. *PASPALUM Plicatum* Michx. Fl. Bor. Amer. 1:45. 1803.

*Paspalum undulatum* Poir. in Lam. Encycl. 5:29. 1804.

*Paspalum lenticulare* H.B.K. Nov. Gen. & Sp. 1:92. 1815.

*Paspalum gracile* LeConte, Jour. de Phys. Chym. 91:285. 1820. Not *P. gracile* Rudge, 1805.

*Paspalus leptos* Schult. Mant. 2: 173. 1824.

*Paspalum montevidense* Spreng. Syst. Veg. 1:246. 1825.

*Paspalum tenue* Kunth, Rév. Gram. 1:26. 1829. Not *P. tenue* Gaertn., 1791.

*Paspalum multiflorum* Desv. Opusc. 58. 1831.

*Paspalum orthos* Schult. ex Kunth, Enum. Pl. 1:57. 1833.

*Paspalum marginatum* Spreng. in Steud. Nom. Bot. ed. 2. 2:272. 1841, as synonym of *P. undulatum* Poir. Not *P. marginatum* Trin., 1826.

*Panicum campestre* Schlecht. Linnaea 26:131. 1853. Not *P. campestre* Trin., 1834.

*Paspalum atrocarpum* Steud. Syn. Pl. Glum. 1:25. 1854.

*Paspalum antillense* Husn. Bull. Soc. Linn. Normand. II. 5:260. 1871.

*Paspalum saxatile* Salzm. ex Doell in Mart. Fl. Bras. 2<sup>2</sup>:76. 1877.

*Paspalum decumbens* Sagot ex Doell in Mart. Fl. Bras. 2<sup>2</sup>:77. 1877. Not *P. decumbens* Swartz, 1788.

*Paspalum plicatum* var. *intumescens* Doell in Mart. Fl. Bras. 2<sup>2</sup>:78. 1877.

*Paspalum pauperculum* Fourn. Mex. Pl. 2:10. 1886.

*Paspalum pauperculum* var. *altius* Fourn. Mex. Pl. 2:10. 1886.

*Panicum plicatum* Kuntze, Rev. Gen. Pl. 3<sup>3</sup>:363. 1898.

Perennial; culms in small tufts, mostly 0.5-1 m. high, erect or ascending, simple or sparingly branched, glabrous; sheaths longer than the internodes, keeled, glabrous or sparsely papillose-pilose; ligule 2-3 mm. long, brown, truncate; blades as much as 50 cm. long, 3-10 mm. wide, firm, flat or folded, glabrous or sparsely papillose-pilose on the upper surface, especially along the margins; racemes few to several, usually arcuate-spreading, 2-10 cm. long with a tuft of long hairs at the base, these sometimes nearly wanting; spikelets 2.5-2.8 mm. long, paired, glabrous or appressed-pubescent, the sterile lemma cross-wrinkled near the margins; fruit dark brown, smooth and shining.

Moist open ground or wood borders, mostly in clay or sandy soil, southern United States and the West Indies to Argentina.

CHIRIQUÍ: El Boquete, *Hitchcock* 8190, 8292, 8293; Dolega, *Hitchcock* 8339½. COCLÉ: Aguadulce, *Pittier* 4914; El Valle, *Bartlett* & *Lasser* 16653. CANAL ZONE: Fort Randolph, *Maxon* & *Harvey* 6514; *Standley* 28600; Gatún, *Piper* 5198; *Hitchcock* 7969; 7981; Empire, *Pittier* 3725; Culebra, *Hitchcock* 7902, 8024; Summit, *Standley* 30000; Madden Dam, *Bartlett* & *Lasser* 16799; between Pedro Miguel and Corozal, *Hitchcock* 7991; between Corozal and Ancón, *Pittier* 6731; Corozal, *Piper* 5206; *Killip* 4099; Ancón, Hill, *Killip* 4012, 4031; *Greenman* & *Greenman* 5138; Ancón, *Killip* 4116; Balboa, *Standley* 25265, 26113, 32099; *Hitchcock* 7995, 8010. PANAMÁ: Chivi-Chivi Trail, *Piper* 5198½; Matías Hernández, *Standley* 28979; Las Sabanas, *Pittier* 6763; *Standley* 25901; Panamá, *Standley* 26874, 29705; Taboga Island, *Pittier* 3622; Chorrera, *Hitchcock* 8124, 8138; Chepo, *Pittier* 4494, 4551, 4742, 4648; Aguarubia, *Killip* 4280.



33. *PASPALUM CENTRALE* Chase, Jour. Washington Acad. Sci. 17:145. f. 2. 1927.

Perennial; culms 15–60 cm. long, in small spreading tufts, ascending or spreading, sometimes rooting at the lower nodes, usually branching; sheaths longer than the internodes, loose, sparsely to densely papillose-pilose; ligule 2–3 mm. long, brown; blades 5–25 cm. long, 3–10 mm. wide, the uppermost reduced, flat, acuminate, pilose or papillose-pilose, sometimes sparsely so, especially on the lower surface; racemes 2–6, 2–7 cm. long, ascending or spreading, often arcuate, the rachis 1–1.3 mm. wide, the margins scabrous, with a tuft of long hairs in the axils; spikelets 2–2.3 mm. long, solitary, elliptic or obovate, glabrous or rarely pubescent; fruit dark brown at maturity, shining, minutely striate.

Along ditches and in moist open ground, El Salvador to Panama.

CHIRIQUÍ: David, *Hitchcock* 8345. COCLÉ: El Valle de Antón, *Allen* 2824. CANAL ZONE: Pedro Miguel, *Allen* 6; Culebra, *Hitchcock* 7985, 8059; Madden Dam, *Bartlett & Lasser* 16797; Balboa, *Hitchcock* 8004, 8005, 8008. PANAMÁ: Chivi Chivi, *Killip* 4077; Las Sabanas, *Pittier* 6817; Matías Hernández, *Pittier* 6760, 6779; Panamá, *Standley* 26796, 27782; Río Tecúmen, *Standley* 29397; Chepo, *Pittier* 4527, 4621; Nuevo San Francisco, *Standley* 30752.

34. *PASPALUM CONVEXUM* Humb. & Bonpl. in Flüggé, Monogr. Pasp. 175. 1810.

*Paspalum villifolium* Steud. Syn. Pl. Glum. 1:20. 1854.

*Paspalum ancylocarpum* Nees ex Steud. Syn. Pl. Glum. 1:27. 1854.

*Paspalum hemicryptum* Wright, Anal. Acad. Cienc. Habana 8:204. 1871; Wright & Sauv. Fl. Cub. 196. 1873.

*Paspalum inops* Vasey, Contr. U. S. Nat. Herb. 1:281. 1893.

*Paspalum inops* var. *major* Vasey in Beal, Grasses N. Amer. 2:89. 1896.

Annual; culms 10–75 cm., usually 20–40 cm., high, erect or ascending, sometimes widely spreading, branching from the lower and middle nodes; sheaths compressed, keeled, longer than the internodes in small plants, shorter than the internodes on taller plants, from glabrous to conspicuously papillose-pilose; ligule about 2 mm. long, brown, fragile; blades 5–23 cm. long, 3–11 mm. wide, the uppermost sometimes reduced, somewhat clasping at the base, conspicuously papillose-pilose throughout or only toward the base; racemes 1–4, erect to spreading at maturity, 1.5–7 cm. long, the rachis 1–2 mm. wide, long-pilose at the base; spikelets 2.2–3 mm. long, paired, broadly obovate, glabrous or appressed-pubescent; fruit dark brown, shining, minutely striate.

Open ground, cultivated and waste places, northern Mexico to Brazil; Cuba and Trinidad, probably introduced.

CHIRIQUÍ: Dolega, *Hitchcock* 8332; David, *Hitchcock* 8369. COCLÉ: Aguadulce, *Pittier* 4959; El Valle, *Bartlett & Lasser* 16652.

35. *PASPALUM BOSCIANUM* Flüggé, Monogr. Pasp. 170. 1810.

*Paspalum virgatum* Walt. Fl. Carol. 75. 1788. Not *P. virgatum* L., 1759.

*Paspalum purpurascens* Ell. Bot. S. C. & Ga. 1:108. pl. 6. f. 3. 1816.

*Paspalum confertum* LeConte, Jour. de Phys. Chym. 91:285. 1820.

*Paspalum virgatum* var. *purpurascens* Wood, Class-book. ed. 3. 781. 1861.

Annual; culms 20–100 cm. high, ascending or spreading, branching, sometimes rooting at the lower nodes, glabrous; sheaths compressed, keeled, longer than



the internodes, glabrous or the lowermost rarely pilose; ligule 2–3.5 mm. long, brown; blades 10–40 cm. long, mostly 15–30 cm., 6–18 mm. wide, glabrous or papillose-pilose on the upper surface toward the base, the margins very scabrous; racemes 2–15, rarely solitary in depauperate plants, 2.5–9 cm. long, ascending or finally spreading, somewhat arcuate, the rachis 2–2.5 mm. wide, scabrous on the margins, usually with a tuft of long hairs at the base; spikelets 2–2.2 mm. long, paired, crowded, obovate to suborbicular, glabrous, rusty brown at maturity, the glume and sterile lemma equal, barely covering the fruit, fragile, not wrinkled; fruit dark brown, shining, minutely papillose-striate.

Moist or wet open ground and waste places, sometimes a weed in cultivated fields, Virginia to Florida and Louisiana; Guatemala, Panama, Puerto Rico, and northern Brazil.

CHIRIQUÍ: David, *Hitchcock* 8359. PANAMÁ: Chivi Chivi, *Killip* 4084.

36. *PASPALUM MELANOSPERMUM* Desv. in Poir. in Lam. Encycl. Suppl. 4:315. 1816.

*Paspalum humile* Steud. Syn. Pl. Glum. 1:25. 1854.

*Paspalum plicatulum* var. *microspermum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:78. 1877.

*Paspalum olivaceum* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18:310. 1917.

Leafy annual, usually tinged with purple; culms erect or decumbent at the base, sometimes rooting at the lower nodes, 40–70 cm. high, glabrous; sheaths loose, thin, compressed, keeled, glabrous; ligule 1.5–2 mm. long; blades commonly 10–15 cm. long, 5–10 mm. wide, sparsely pilose on the upper surface at the base; panicle short-exserted from the upper bladeless sheath, 4–8 cm. long, the axis more or less flexuous; racemes 2–7, arcuate-spreading, 1–6 cm. long, the rachis about 1 mm. wide with a few long hairs at the base; spikelets 2 mm. long, obovate, strongly convex on the back; second glume and sterile lemma equal, thin, glabrous or nearly so, the lemma often minutely wrinkled inside the margin; fruit hemispherical, dark brown, shining.

Open, usually moist ground, Guadeloupe, Martinique, and Panama to Bolivia and Brazil.

CANAL ZONE: vicinity of Madden Dam, on limestone outcrops, *Bartlett & Lasser* 16802.

37. *PASPALUM GARDNERIANUM* Nees, Jour. Bot. Kew Misc. 2:103. 1850.

*Paspalum gardnerianum* var. *oligostachyum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:42. 1877.

*Paspalum gardnerianum* var. *vestitum* Kuhlmann. Comm. Linhas Telegr. Matto Grosso 67:49. 1922.

Perennial; culms slender, 50–110 cm. high, in small dense rather tough tufts, erect from hard, somewhat enlarged, densely woolly bases, simple or sometimes rather freely branching from the lower or middle nodes, glabrous or the lower nodes appressed-pubescent; sheaths longer than the internodes, sparsely to densely papillose-pilose with rather stiff hairs, the upper ones glabrous or nearly so; ligule less than 0.5 mm. long; blades 5–35 cm. long, 3–8 mm. wide, erect to spreading, flat or drying involute toward the tip, from glabrous to puberulent and rather



conspicuously papillose-pilose; racemes 1-10, mostly 3-5, erect to arcuate-spreading, rather remote on a slender axis, the lower ones 2.5-10 cm. long, the rachis about 1 mm. wide, densely pilose at the base; spikelets 1.6-1.9 mm. long, obovate-elliptic, paired, crowded, the short pedicels bearing a tuft of stiff golden hairs which exceed the spikelets; glume wanting, the sterile lemma as long as the fruit, glabrous or sparsely pubescent; fruit chestnut-brown, strongly papillose-striate, the margins of the lemma pale and smooth.

Sandy savannas and rocky slopes, Panama to Argentina.

COCLÉ: Natá, *Allen 847*. PANAMÁ: Chorrera, *Hitchcock 8169*.

38. *PASPALUM FIMBRIATUM* H.B.K. *Nov. Gen. & Sp.* 1:93. *pl.* 28. 1815.

Annual; culms 25-100 cm. high, erect or ascending, branching from the lower and sometimes the middle nodes, glabrous; sheaths much longer than the internodes or the upper ones shorter, compressed, keeled, glabrous, or sparsely papillose-pilose, especially along the margins; ligule 0.5-2 mm. long, thin, brown; blades 5-40 cm. long, 5-12 mm. wide, thin, flat, acuminate, slightly rounded at the base, glabrous or papillose-pilose on the upper surface toward the base, the margins scabrous, mostly rather prominently papillose-ciliate; racemes 2-8, 2.5-8 cm. long, ascending or spreading, somewhat distant on the flattened axis, the rachis narrowly winged, about 1.5 mm. wide with a tuft of long hairs at the base; spikelets 2.2-2.3 mm. long, 3 mm. wide including the winged margins, paired, crowded; glume broadly ovate, apiculate, papillose, the margins with a broad, conspicuous, irregularly notched, stiffly ciliate wing; sterile lemma a little shorter than the glume, obtuse, apiculate, the midnerve strong, the margins winged like the glume or usually only partially winged, sometimes wingless; fruit 2 mm. long, pale, ovate, minutely roughened, the nerves evident.

Moist ground, savannas, waste places, and open fields, the West Indies and Panama to Colombia and northern Brazil; introduced in the Hawaiian Islands.

CANAL ZONE: France Field, *Standley 28583*.

39. *PASPALUM SACCHAROIDES* Nees in *Trin. Gram. Icon.* 1: *pl.* 107. 1828.

*Saccharum polystachyum* Swartz, *Prodr. Veg. Ind. Occ.* 21. 1788. Not *Paspalum polystachyum* R. Br., 1810.

*Panicum saccharoides* Kunth, *Rév. Gram.* 2:237. *pl.* 30. 1830.

*Tricholaena saccharoides* Griseb. *Syst. Unt. Veg. Karaib.* 117. 1857.

*Paspalum polystachyum* Kuntze, *Rev. Gen. Pl.* 2:786. 1891. Not *P. polystachyum* R. Br., 1810.

Perennial; culms 1-2 m. high in coarse tough clumps, ascending or suberect, often decumbent or creeping at the base; sheaths longer than the internodes, glabrous or papillose-pilose, sometimes papillose only, the margins densely silky-ciliate with long soft hairs; ligule a very short obscure firm membrane; blades 15-30 cm. long, 8-15 mm. wide, spreading, tapering to a rather fine involute tip, finely pilose or papillose on the upper surface, the lower surface and margins glabrous; inflorescence dense, flabellate, feathery, composed of 30-50 slender drooping racemes 15-30 cm. long, crowded on a short axis; rachis about 0.6 mm. wide,



often naked toward the base with a dense tuft of long hairs in the axils; spikelets 2.5–3 mm. long, relatively distant, lanceolate, acuminate, solitary; glume and sterile lemma thin, the glume sparsely pubescent on the back, fringed with pale silky hairs, 5–8 mm. long, the sterile lemma shorter than the glume, glabrous; fruit about 1.9 mm. long, acute, pale, smooth, only slightly indurate.

Open, brushy, or wooded slopes, Costa Rica and the Lesser Antilles to Bolivia.

CANAL ZONE: Toro Point, *Hitchcock 8045*; Barro Colorado Island, *Bailey & Bailey 38*; *Kenoyer 112*; *Shattuck 303*; between Las Cascadas and Bas Obispo, *Pittier 3745*; Culebra, *Hitchcock 7904*.

### 53. PANICUM L.

PANICUM L. Sp. Pl. 55. 1753.

Spikelets paniculate or sometimes short-pedicelled in one-sided racemes; first glume minute to nearly as long as the spikelet; second glume and sterile lemma nearly equal, similar, the lemma often enclosing a hyaline palea and sometimes a staminate flower; fertile floret indurate, the nerves obsolete, the margins of the lemma inrolled, firmly enclosing the palea.

Annuals or perennials, exceedingly variable in habit, size, and appearance.

- a. Basal blades distinctly different from the culm blades, forming winter rosettes; culms at first simple, finally sparingly to freely branching.
- b. Plants light green, the blades of the rosette forming small soft dense cushions; culms 10–20 cm. high, branching from the base; blades conspicuously ciliate ..... 1. *P. STRIGOSUM*
- bb. Plants dark green or olivaceous, the basal blades not forming dense soft cushions; culms 20–100 cm. high, branching from the middle and upper nodes; blades not conspicuously ciliate or only near the base.
- c. Ligule obsolete or nearly so; blades glabrous or nearly so with firm, white margins, ciliate near the base; culms sparingly branching ..... 2. *P. SPHAEROCARPON*
- cc. Ligule 2–4 mm. long, ciliate; blades densely pubescent or villous; culms finally freely branching, the blades and panicles of the branches reduced.
- d. Blades velvety-pubescent; spikelets 1.8–1.9 mm. long; culms mostly more than 70 cm. long from a creeping base ..... 3. *P. VISCIDELLUM*
- dd. Blades not velvety; spikelets 1.9–2 mm. long; culms less than 50 cm. long ..... 4. *P. OLIVACEUM*
- aa. Basal blades similar to the culm blades.
- b. Plants annual.
- c. Fruit transversely rugose; spikelets short-pedicelled along the raceme-like branches.
- d. Spikelets glabrous, brown, 2.5–3 mm. long ..... 7. *P. FASCICULATUM*
- dd. Spikelets densely pubescent, 3.5–4 mm. long ..... 8. *P. MOLLE*
- cc. Fruit smooth; spikelets in open panicles.
- d. First glume one-fourth as long as the spikelet, obtuse or subacute. Glabrous, rather succulent, subaquatic annual ..... 9. *P. CHLOROTICUM*
- dd. First glume at least half as long as the spikelet.
- e. Culms erect; spikelets at least 2 mm. long; blades elongate.
- f. Culms robust, 1.5 m. or more high; spikelets 2 mm. long ..... 12. *P. HIRSUTUM*
- ff. Culms slender, not more than 75 cm. high.
- g. Spikelets 2.2 mm. long; panicles terminal and axillary, crowded, implicate ..... 11. *P. CAYENNENSE*
- gg. Spikelets 2.5–3.3 mm. long; panicles not implicate ..... 10. *P. HIRTICAULE*
- ee. Culms decumbent-spreading; spikelets 1.5 mm. long; blades ovate or elliptic.



- f. Panicles 2-5 cm. long, with delicate flexuous, spreading or reflexed branches; spikelets pyriform, glabrous..... 25. *P. PYRULARIUM*
- ff. Panicles 5-20 cm. long, the branches delicate but not flexuous, ascending to spreading; spikelets elliptic, pubescent..... 27. *P. TRICHOIDES*
- bb. Plants perennial.
- c. Spikelets short-pedicellate along one side of the panicle branches, forming spike-like or 1-sided racemes.
- d. Fruit transversely rugose.
- e. Culms slender, less than 1 m. long; nodes glabrous..... 5. *P. GEMINATUM*
- ee. Culms coarse, as much as 6 m. long; nodes bearded..... 6. *P. PURPURASCENS*
- dd. Fruit smooth, not rugose.
- e. Blades lanceolate or ovate-lanceolate.
- f. Spikelets sparsely pilose, the sterile lemma with two crateriform glands on the back..... 16. *P. PULCHELLUM*
- ff. Spikelets glabrous, glandless.
- g. Blades 1-5 cm. long; racemes few to several, scarcely crowded..... 17. *P. STOLONIFERUM*
- gg. Blades 5-11 cm. long; racemes numerous, crowded..... 18. *P. FRONDESCENS*
- ee. Blades linear, often elongate, frequently cordate at the base.
- f. Spikelets nearly sessile, densely arranged along one side of the pilose rachis.
- g. Culms as much as 2 m. high; panicles 25-45 cm. long..... 19. *P. MILLEFLORUM*
- gg. Culms not more than 1 m. high; panicles 5-15 cm. long..... 20. *P. PILOSUM*
- ff. Spikelets in part on short branchlets on the lower side of the rachis.
- g. Blades 20-25 cm. long, 1.5-3 cm. wide; panicles 20-40 cm. long..... 24. *P. STAGNATILE*
- gg. Blades not more than 15 cm. long; panicles 5-30 cm. long.
- h. Nodes pubescent..... 21. *P. POLYGONATUM*
- hh. Nodes glabrous.
- i. Blades narrowed toward the base..... 22. *P. LAXUM*
- ii. Blades somewhat cordate at the base..... 23. *P. BOLIVIENSE*
- cc. Spikelets in open or contracted panicles but not on 1-sided racemes.
- d. Fruit transversely rugose. Culms in large coarse clumps..... 36. *P. MAXIMUM*
- dd. Fruit not rugose.
- e. First glume much less than one-fourth as long as the spikelet.
- f. Sheaths glabrous on the back, densely pubescent on the collar; panicles mostly 4-8 cm. long; blades 5-12 mm. wide..... 30. *P. ARUNDINARIAE*
- ff. Sheaths pilose or papillose-pilose; panicles 10-15 cm. long; blades 1-2.5 cm. wide..... 31. *P. SCHIFFNERI*
- ee. First glume more than one-fourth as long as the spikelet.
- f. Blades as much as 1 m. long and 6 cm. wide..... 38. *P. GRANDE*
- ff. Blades much smaller.
- g. Fruit crested at the apex. Spikelets 5.5-6 mm. long..... 39. *P. ZIZANIODES*
- gg. Fruit not crested.
- h. Panicles narrow and few-flowered. Culms erect, wiry..... 34. *P. STENODOIDES*
- hh. Panicles many-flowered.
- i. Panicles 40-60 cm. long, the elongate branches in verticils..... 37. *P. MERTENSII*
- ii. Panicles not more than 30 cm. long, the branches not in verticils.
- j. First glume blunt or rounded, seldom subacute, two-thirds as long as the spikelet or more.
- k. Spikelets 2 mm. long; panicles all alike, 10-20 cm. long..... 29. *P. SELLOWII*
- kk. Spikelets 2.7-3.5 mm. long; primary panicles open, the secondary narrow, reduced, partly enclosed in the sheath.
- l. Plant glabrous or the blades sparsely pilose..... 32. *P. CORDOVENSE*
- ll. Plants velvety pubescent..... 33. *P. PANTRICHUM*
- jj. First glume acute or acuminate, not more, usually less, than two-thirds as long as the spikelet.



- k. Spikelets 1.2–1.5 mm. long, the first glume one-fifth as long as the spikelet..... 28. *P. TRICHANTHUM*
- kk. Spikelets 2.3–4 mm. long.
- l. Culms erect, or finally spreading.
- m. Spikelets glabrous.
- n. Spikelets 3 mm. long; sheaths prominently papillose-hispid..... 13. *P. GHIESBREGHTII*
- nn. Spikelets 3.5–4 mm. long; sheaths glabrous..... 14. *P. RIGIDUM*
- m. Spikelets sparsely hispid. Panicles terminal and axillary, implicate, partly enclosed in the sheath..... 15. *P. RUDGEI*
- ll. Culms straggling.
- m. Culms coarse and stout, 2–4 m. long; spikelets 3.2–4 mm. long, glabrous, turgid, gaping; first glume about two-thirds as long as the spikelet..... 35. *P. ALTUM*
- mm. Culms slender, mostly about 1 m. long; spikelets 2.3–2.5 mm. long, sparsely pilose; first glume about half as long as the spikelet..... 26. *P. HAENKEANUM*

1. *PANICUM STRIGOSUM* Muhl. ex Ell. Bot. S. C. & Ga. 1:126. 1816.

*Panicum laxiflorum* var. *pubescens* Vasey, Contr. U. S. Nat. Herb. 3:30. 1892.

*Panicum longipedunculatum* Scribn. Bull. Tenn. Exp. Sta. 7:53. 1894.

Perennial; culms in dense soft spreading tufts, mostly 10–20 cm. high; sheaths glabrous, the margins ciliate; blades 2–5 cm. long, 3–6 mm. wide, thin, light green, sparsely pilose on the upper surface, conspicuously papillose-ciliate on the margins; panicles 2–5 cm. long, the axis pilose, the branches stiffly ascending or spreading; spikelets 1.3–1.5 mm. long, glabrous, the first glume one-third to half as long as the spikelet; fruit 1.3 mm. long.

Woods and dry rocky slopes, southeastern United States, Mexico, and the West Indies to Colombia.

COCLÉ: El Valle, *Allen* 772. CANAL ZONE: Ancón Hill, *Killip* 4020. PANAMÁ: Hacienda La Joya, *Dodge*, *Hunter*, *Steyermark* & *Allen* 16884.

2. *PANICUM SPHAEROCARPON* Ell. Bot. S. C. & Ga. 1:125. 1816.

*Panicum kalmii* Swartz, Adnot. Bot. 6. 1829.

*Panicum dichotomum* γ. *sphaerocarpon* Wood, Class-book. ed. 3. 786. 1861.

*Panicum nitidum* var. *crassifolium* A. Gray ex Doell in Mart. Fl. Bras. 2<sup>2</sup>:247. 1877.

*Panicum microcarpon* var. *sphaerocarpon* Vasey, Grasses U. S. 12. 1883.

Perennial; culms 20–55 cm. high, in small tufts, erect or spreading, the nodes appressed-pubescent; sheaths usually longer than the internodes, the margins ciliate, otherwise glabrous, often viscid between the nerves, especially toward the summit; ligule very short or obsolete; blades 4–10 cm. long, 5–15 mm. wide, cordate, the white cartilaginous margins papillose-ciliate toward the base; panicles 5–10 cm. long, long-exserted, loosely flowered, the axis, branches and pedicels viscid; spikelets subspherical, 1.6–1.8 mm. long, pubescent, or sometimes nearly glabrous; fruit 1.4–1.5 mm. long. Autumnal phase sparingly branched, spreading, the blades and panicles not much reduced.



Sandy or gravelly banks, roadsides and open woods, eastern United States, Mexico, and Cuba to Venezuela.

CHIRIQUÍ: El Boquete, *Hitchcock* 8172, 8343.

3. *Panicum viscidellum* Scribn. U. S. Dept. Agr. Div. Agrost. Circ. 19:2. 1900.  
*Panicum reflexopilum* Steud. Syn. Pl. Glum. 1:84. 1854.

Perennial; culms 30–100 cm. long, ascending from a decumbent, widely spreading or creeping base, simple at first but finally rather freely branching, softly villous or nearly glabrous, the nodes usually bearded; sheaths mostly shorter than the internodes, pilose or papillose-pilose, sometimes nearly glabrous; ligule densely ciliate, 2–4 mm. long; blades 5–13 cm. long, 9–13 mm. wide, lanceolate, subcordate, softly pubescent or villous on both surfaces; panicles 4–11 cm. long, rather densely flowered, the branches ascending, spreading, or even reflexed, the branchlets and pedicels spreading, implicate; spikelets 1.8–1.9 mm. long, sparsely pubescent or nearly glabrous; first glume about one-third as long as the spikelet, subacute; second glume and sterile lemma rather strongly nerved, slightly exceeding the fruit; fruit 1.5 mm. long, abruptly pointed.

Dry fields, open forests and grassy banks, southern Mexico to Colombia and Brazil.

CHIRIQUÍ: El Boquete, *Killip* 4565; *Pittier* 3043; *Hitchcock* 8178.

4. *Panicum olivaceum* Hitchc. & Chase, Contr. U. S. Nat. Herb. 15:225. f. 234. 1910.

Perennial; culms 20–40 cm. high, erect or spreading at the base, softly appressed-villous, the nodes bearded; sheaths mostly shorter than the internodes, velvety pilose with spreading hairs; ligule ciliate, 3–4 mm. long; blades 4–7 cm. long, 5–8 mm. wide, the uppermost reduced, stiffly ascending or spreading, rather densely softly pubescent on the lower surface, pubescent or villous on the upper, the margins scabrous; panicles 3–7 cm. long, the axis pilose; spikelets 1.9–2 mm. long, pubescent, the first glume subacute, one-fourth to one-third as long as the spikelet; fruit 1.6 mm. long. Autumnal phase decumbent-spreading, freely branching from the upper and middle nodes, the reduced branches appressed, the blades 1–2 cm. long, 2–4 mm. wide.

Fields, open woods, open or brushy banks and roadsides, southern Mexico to Venezuela.

CHIRIQUÍ: El Boquete, *Maxon* 5136; *Hitchcock* 8189, 8252, 8280; *Killip* 4525a, 4526, 4556, 4560, 4563.

5. *Panicum geminatum* Forsk. Fl. Aegypt. Arab. 18. 1775.

*Paspalum appressum* Lam. Tabl. Encycl. 1:176. 1791.

*Digitaria appressa* Pers. Syn. Pl. 1:85. 1805.

*Panicum beckmanniaeforme* Mikan ex Trin. in Spreng. Neu. Entd. 2:83. 1821.

*Panicum truncatum* Trin. Gram. Pan. 130. 1826.

*Panicum brizaeforme* Presl, Rel. Haenk. 1:302. 1830.

*Panicum carnosum* Salzm. ex Steud. Syn. Pl. Glum. 1:60. 1854.



*Panicum glomeratum* Buckl. Prel. Rep. Geol. Agr. Surv. Tex. App. 3. 1866.

*Panicum appressum* Lam. ex Doell in Mart. Fl. Bras. 2<sup>2</sup>:184. 1877.

*Paspalidium geminatum* Stapf in Prain, Fl. Trop. Afr. 9:583. 1920.

Perennial; culms cespitose, spreading from a decumbent base, 25–85 cm. long, succulent at least toward the base, smooth, shining; sheaths longer than the internodes, more or less inflated; ligule ciliate, about 1 mm. long; blades 10–20 cm. long, 3–6 mm. wide, flat or loosely rolled, glabrous on the lower surface, scaberulous on the upper, the margins glabrous or scabrous; panicle 12–30 cm. long with 12–18 rather short erect or ascending racemes; spikelets 2–2.5 mm. long, about 1.5 mm. wide, acute, the first glume 0.5 mm. long, clasping, truncate; fruit strongly transversely rugose.

Wet ground, ditches, often floating in margins of lakes. Tropical regions of both hemispheres.

CANAL ZONE: Balboa, Standley 25631, 30877; Gatún, Hitchcock 7980; Killip 4292; between Corozal and Ancón, Pittier 2168, 2170; Pedro Miguel, Hitchcock 7956; Empire, Pittier 3714; Barro Colorado Island, Kenoyer 124.

#### 6. PANICUM PURPURASCENS Raddi, Agrost. Bras. 47. 1823.



Fig. 22  
*Panicum purpurascens*

*Panicum barbinode* Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 1:256. 1834.

*Panicum guadaloupense* Steud. Syn. Pl. Glum. 1:61. 1854.

*Panicum equinum* Salzm. ex Steud. Syn. Pl. Glum. 1:67. 1854.

*Panicum pictigluma* Steud. Syn. Pl. Glum. 1:73. 1854.

*Panicum paraguayense* Steud. ex Doell in Mart. Fl. Bras. 2<sup>2</sup>:189. 1877.

Stoloniferous perennial; culms as much as 6 m. long, coarse, decumbent at the base and rooting at the lower nodes, often geniculate, the nodes densely villous; sheaths mostly longer than the internodes, papillose or papillose-pilose, densely pubescent on the collar; ligule ciliate, 0.5–1 mm. long; blades 10–25 cm. long, 8–15 mm. wide, acuminate, the margins strongly scabrous; panicles 10–20 cm. long with several solitary or fascicled spreading racemes; spikelets 3 mm. long, glabrous, pointed, the first glume 1 mm. long, acute, the pedicels bearing a few long stiff hairs below the spikelets; fruit about 2.5 mm. long, obtuse, minutely transversely rugose.

Cultivated and waste ground, escaped from cultivation, throughout tropical and subtropical America. Commonly cultivated for forage.

CHIRIQUÍ: El Boquete, Hitchcock 8266. CANAL ZONE: Gatún, Pittier 2559; Hitchcock 8031½; Frijoles, Standley 27654; Killip 4301; Darién, Standley 31582; Culebra, Hitchcock 7931; Standley 26032; Pittier 4807. PANAMÁ: Chagres River, Piper 5256; Chepo, Pittier 4734.



7. *Panicum fasciculatum* Swartz, Prodr. Veg. Ind. Occ. 22. 1788.*Panicum chartaginense* Swartz, Prodr. Veg. Ind. Occ. 22. 1788.*Panicum fuscum* Swartz, Prodr. Veg. Ind. Occ. 23. 1788.*Panicum flavescens* Swartz, Prodr. Veg. Ind. Occ. 23. 1788.*Panicum fusco-rubens* Lam. Tabl. Encycl. 1:171. 1791.*Panicum fastigiatum* Poir. in Lam. Encycl. Suppl. 4:277. 1816.*Panicum spithamaeum* Willd. ex Nees, Agrost. Bras. 152. 1829.*Panicum illinoiense* Desv. Opusc. 91. 1831.*Panicum reticulatum* Griseb. Abh. Ges. Wiss. Gött. 7:264. 1857. Not *P. reticulatum* Torr. 1852.*Panicum fuscum fasciculatum* Griseb. Fl. Brit. W. Ind. 547. 1864.*Panicum fasciculatum genuinum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:204. 1877.*Panicum fasciculatum flavescens* Doell in Mart. Fl. Bras. 2<sup>2</sup>:205. 1877.*Panicum fasciculatum fuscum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:205. 1877.*Panicum fasciculatum chartaginense* Doell in Mart. Fl. Bras. 2<sup>2</sup>:205. 1877.

Annual; culms slender, branching, erect or decumbent at the base, glabrous or papillose-hispid, 15 cm. to as much as 1 m. long; sheaths papillose or papillose-hispid, especially on the margins; blades 5–25 cm. long, 0.5–2 cm. wide, glabrous or scaberulous, the margins scabrous; panicles 3–15 cm. long, rather dense, the branches ascending to spreading; spikelets 2.5–3 mm. long, dark brown, often tinged with purple, glabrous, the second glume and sterile lemma prominently reticulate-veined; fruit pale, strongly transversely rugose, acute.

Open woods, thickets, a weed in fields and waste places, Florida, Texas, and the West Indies to Ecuador and Brazil.

BOCAS DEL TORO: Laguna de Chiriquí, von Wedel 1216, 1448, 2504. CHIRIQUÍ: David, Hitchcock 8350. COLÓN: Porto Bello, Pittier 2478. SAN BLAS: Puerto Obaldía, Pittier 4375. CANAL ZONE: Balboa, Standley 25236, 25247; Culebra, Hitchcock 7908, 7932; Empire, Pittier 3718; Las Cruces Trail, Standley 29115. PANAMÁ: Matías Hernández, Pittier 4719, 6902, 6921; Panamá, Bartlett & Lasser 16329, 16330; Chepo, Pittier 4695; Taboga Island, Killip 4148, Hitchcock 8076, 8079; Woodson, Allen & Seibert 1526; Standley 27027, 27909. DARIÉN: Boca de Cupe, Allen 898.

8. *Panicum molle* Swartz, Prodr. Veg. Ind. Occ. 22. 1788.

Annual; culms 15–75 cm. long, erect or ascending, often geniculate and rooting at the lower nodes, finely pubescent or pilose, especially below the densely pubescent nodes; sheaths softly pubescent, usually shorter but often longer than the internodes; ligule ciliate, about 1 mm. long; blades 5–25 cm. long, 6–20 mm. wide, or sometimes those of the branches smaller, softly pubescent on both surfaces, the white firm margins scabrous; panicles 5–12 cm. long, the main axis and rachises of narrowly ascending racemes densely pubescent; spikelets 3.5–4 mm. long, rather dense, usually brown or tinged with purple, abruptly pointed, densely pubescent, the first glume broad, acute, half to three-fourths as long as the spikelets; fruit 2.5–3 mm. long, acute or apiculate, finely transversely rugose.

Dry or moist ground in fields and waste places, sometimes in brush and open woods, central Mexico to Argentina.

CANAL ZONE: Madden Dam, Bartlett & Lasser 76803. PANAMÁ: Taboga Island, Hitchcock 8067; Chamé Point, Hitchcock 8168.

9. *Panicum chloroticum* Nees ex Trin. Gram. Pan. 236. 1826.



Annual; culms prostrate or ascending, 30–60 cm. or sometimes more than 1 m. long, branching, rather succulent; sheaths somewhat inflated, glabrous; ligule ciliate, 2–3 mm. long; blades flat, abruptly acute, 5–20 cm. long, 4–10 mm. wide, the margins scabrous; panicles 5–20 cm. long, the branches rather stiffly ascending or spreading, naked toward the base; spikelets appressed, 2.5 mm. long, lanceolate, glabrous, the first glume about one fourth as long as the spikelet.

Wet open ground, Mexico (Sinaloa) to Argentina.

CANAL ZONE: Gatún, *Hitchcock* 7977. PANAMÁ: Chepo, *Pittier* 4614; La Jagua, *Bartlett & Lasser* 16990.

10. *Panicum hirticaule* Presl, Rel. Haenk. 1:308. 1830.

*Panicum flabellatum* Fourn. Bull. Soc. Bot. France II. 27:293. 1880.

*Panicum polygonatum* var.  $\beta$ . *hirticaule* Fourn. Mex. Pl. 2:28. 1886.

Annual; culms 15–70 cm. high in small erect tufts, sparingly branched, papillose-hispid, especially below the nodes; sheaths usually a little shorter than the internodes, conspicuously papillose-hispid with spreading hairs; ligule ciliate, about 1 mm. long; blades 8–25 cm. long, 4–10 mm. wide, lanceolate, subcordate, sparsely to rather densely papillose-hispid, the margins scabrous and often papillose-hispid-ciliate; panicles 5–15 cm. long, usually brown, the rather slender ascending branches naked in the lower half; spikelets 2.5–3.3 mm. long, acuminate or abruptly pointed, the first glume acute, half to two-thirds as long as the spikelet; fruit 1.8–2 mm. long, smooth and shining.

Fields, brushy slopes, and waste ground, southwestern United States to Bolivia.

CANAL ZONE: Balboa, *Standley* 25277, 27407. PANAMÁ: Taboga Island, *Standley* 27960.

11. *Panicum cayennense* Lam. Tabl. Encycl. 1:173. 1791.

*Panicum pedunculare* Willd. ex Steud. Syn. Pl. Glum. 1:77. 1854.

*Panicum cayennense* var.  $\alpha$ . *patulum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:220. 1877.

Annual; culms 20–75 cm. high, usually erect, simple or sometimes much branched at the base; sheaths densely papillose-hispid, the hairs ascending or spreading; ligule ciliate, 1–1.5 mm. long; blades 12–20 cm. long, 5–8 mm. wide (smaller in depauperate specimens), linear-lanceolate, sparsely to rather densely papillose-pilose, the margins very scabrous; panicles terminal and axillary, 8–20 cm. long, the branches and branchlets divergent, becoming implicate, few-flowered; spikelets about 2.2 mm. long, obovoid, strongly nerved, the first glume acute, half as long as the spikelet; fruit 1.7 mm. long.

Fields, thickets, open ground, and roadsides, often weedy, Mexico (Chiapas) and the Greater Antilles to Brazil.

CHIRIQUÍ: Dolega, *Hitchcock* 8335; David, *Hitchcock* 8372. PANAMÁ: Arraiján, *Woodson, Allen & Seibert* 1402.

12. *Panicum hirsutum* Swartz, Fl. Ind. Occ. 1:173. 1797.

Perennial; culms robust, erect, 1.5 m. or more high, the nodes densely appressed-pubescent; sheaths papillose or papillose-pilose, somewhat inflated; ligule 4–5 mm.



long, densely ciliate; blades 30–60 cm. long, 1.5–4 cm. wide, glabrous or nearly so on both surfaces, the margins scabrous-serrate; panicles as much as 45 cm. long, the branches narrowly ascending or somewhat spreading, densely flowered, naked toward the base; spikelets 2 mm. long, acute, glabrous, the first glume acute or subobtuse, about half as long as the spikelet.

Old fields, brushy slopes, forests and swamps, Yucatan, the West Indies, Honduras, and Panama.

BOCAS DEL TORO: Changuinola Valley, *Dunlap 37a*. SAN BLAS: Puerto Obaldía, *Pittier 4374*. CANAL ZONE: Gamboa, *Standley 28444*; Gorgona, *Hitchcock 7964*; Culebra, *Pittier 3441*; Bohio, *Hitchcock 8392, 8397*. PANAMÁ: Matías Hernández, *Pittier 6943*.

13. *Panicum ghiesbreghtii* Fourn. Mex. Pl. 2:29. 1886.

*Panicum birtivaginum* Hitchc. Contr. U. S. Nat. Herb. 12:223. 1909.

Perennial; culms 25–80 cm. high, erect, in small tufts, rather coarse, papillose-hispid with ascending or spreading hairs; sheaths papillose-hispid, mostly longer than the internodes; ligule membranaceous, ciliate, about 1 mm. long; blades mostly 15–30 cm. long, rarely as much as 60 cm., 4–10 mm. wide, rather thin, sparsely to densely papillose-hispid; panicles 15–30 cm. long, the branches stiffly ascending, naked in the lower half; spikelets 3 mm. long, lanceolate, glabrous, the first glume acute, about half as long as the spikelet; fruit 2 mm. long.

Fields, roadsides, and thickets, usually in low moist ground, Mexico and the West Indies to Brazil and Bolivia.

CHIRIQUÍ: David, *Hitchcock 8377*. CANAL ZONE: Ancón, *Killip 4100*; Balboa, *Hitchcock 7997, 8014*. PANAMÁ: Chepo, *Hunter & Allen 63*; Taboga Island, *Hitchcock 8065, 8094*.

14. *Panicum rigidum* Swallen, sp. nov.

Perenne; culmi 15–20 cm. alti, erecti vel geniculati; vaginae approximatae internodiis multo longiores, carinatae, glabrae; ligula ca. 1 mm. longa; laminae 8–10 cm. longae, 5–10 mm. latae, acuminatae, supra papilloso-pilosae vel villosae; paniculae 5–8 cm. longae, ramis et ramulis adscendentes vel patentibus, basi nudis; spiculae 3.5–4 mm. longae, appressae, glabrae; gluma prima 1.5 mm. longa, acuta; gluma secunda et lemma sterile aequalia, acuta, fructu longiora; fructus 3 mm. longus, 1.1 mm. latus, abrupte acutus.

Perennial; culms 15–20 cm. high, simple or branched from the lower nodes, stiffly erect or geniculate-spreading at the nodes; sheaths crowded, much longer than the short internodes, keeled, glabrous; ligule membranaceous, ciliate, about 1 mm. long including the cilia; blades 8–10 cm. long, 5–10 mm. wide, acuminate, rounded and clasping at the base, the margins and lower surface glabrous, the upper surface sparsely to densely papillose-pilose or villous; panicles 5–8 cm. long, short-exserted or partly enclosed in the sheath, the branches and branchlets stiffly ascending or spreading, naked at the base; spikelets 3.5 mm. long, appressed, glabrous; first glume 1.5 mm. long, broad, clasping, triangular, acute; second glume and sterile lemma equal, acute, pointed beyond the fruit; fruit 3 mm. long, 1.1 mm. wide, abruptly acute or pointed, with a few short hairs at the tip.



Savannas, Panama.

PANAMÁ: Sabana de Juan Corso, near Chepo, alt. 60–80 m., *Pittier 4526* (U. S. Nat. Herb., TYPE).

15. PANICUM RUDGEI Roem. & Schult. Syst. Veg. 2:444. 1817.

*Panicum scoparium* Rudge, Pl. Guian. 1:21. 1805. Not *P. scoparium* Lam., 1798.

*Panicum rudgei*  $\beta$ . *brasiliense* Raddi, Agrost. Bras. 48. 1823.

*Panicum dasytrichum* Spreng. Syst. Veg. 1:317. 1825.

*Panicum rhigiophyllum* Steud. Syn. Pl. Glum. 1:76. 1854.

*Panicum cayennense* var. *divaricatum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:220. 1877.

Perennial; culms 40–110 cm. high, suberect to spreading, rather coarse, appressed papillose-hispid especially below the nodes; sheaths longer or shorter than the internodes, densely papillose-hispid with appressed or spreading hairs; ligule ciliate, about 1 mm. long; blades 15–40 cm. long, 5–10 mm. wide, thick and firm, ascending, gradually acuminate, densely hirsute to nearly glabrous; panicles terminal and axillary from the upper sheaths, included at the base, overlapping, the branches spreading, implicate, pilose in the axils; spikelets 3.5 mm. long, pointed, somewhat attenuate at the base, sparsely hirsute, the first glume acuminate, two-thirds as long as the spikelet; fruit 2.1 mm. long, smooth and shining.

Dry open ground and brushy slopes, Guatemala and Jamaica to Brazil and Colombia.

CANAL ZONE: Fort Randolph, *Standley 28598*. PANAMÁ: Taboga, *Killip 4163*.

16. PANICUM PULCHELLUM Raddi, Agrost. Bras. 42. 1823.

*Eriochloa?* *pulchella* Kunth, Rév. Gram. 1:30. 1829.

*Panicum leptostachyum* Presl, Rel. Haenk. 1:311. 1830.

*Panicum bipustulatum* Schlecht. Linnaea 26:135. 1853.

*Hymenachne leptostachya* Fourn. Mex. Pl. 2:36. 1886.

Perennial though often appearing like an annual; culms 15–75 cm. long, slender, rather delicate, decumbent at the base and rooting at the lower nodes, the branches ascending or erect, the nodes pubescent; sheaths much shorter than the internodes, more or less pilose, the margins ciliate; blades thin, ovate-lanceolate, asymmetrical, subcordate, 1.5–5 cm. long, 8–18 mm. wide, pilose or nearly glabrous; panicles 3–14 cm. long, the racemes 5–15 mm. long, rather stiffly spreading or reflexed, rather distant or approximate; spikelets 2 mm. long, turgid, pilose, the hairs longer near the margins; first glume acute, about one-third the length of the spikelet, the sterile lemma with two conspicuous crateriform glands; fruit 1.3 mm. long.

Shady banks, moist thickets, and forests, southern Mexico and the Windward Islands to Brazil.

CHIRIQUÍ: Cerro Vaca, *Pittier 5375*. COLÓN: Catival, *Standley 30176*. CANAL ZONE: Fort Sherman, *Standley 31045*; Culebra, *Pittier 2226*; Obispo, *Standley 31751*; Summit, *Standley 29628*; Corozal, *Hitchcock 9200*; Quebrada Bonita, *Steyermark & Allen 17157*. PANAMÁ: Río Tecúmen, *Standley 26554*; Chepo, *Hunter & Allen 54*.

17. PANICUM STOLONIFERUM Poir. in Lam. Encycl. Suppl. 4:274. 1816.

*Panicum ctenodes* Trin. Gram. Icon. 2: pl. 171. 1829.

*Panicum leprieurii* Steud. Syn. Pl. Glum. 1:65. 1854.



Perennial; culms very slender, decumbent-spreading, branching, rooting at the lower nodes, 10–50 cm. long, the nodes pubescent or glabrous; sheaths usually much shorter than the internodes, ciliate; blades 1–5 cm. long (rarely to 7 cm.), 3–15 mm. wide, glabrous or minutely pubescent; panicles 1–5 cm. long, with few to several abruptly spreading racemes 5–10 mm. long; spikelets 2.5 mm. long, the first glume acute, one-third to half as long as the spikelet; fruit 1.3 mm. long.

Moist woods, swamps, and low ground, Guatemala to Ecuador and Brazil.

BOCAS DEL TORO: Isla Colón, *von Wedel* 1254. CANAL ZONE: Frijoles, *Hitchcock* 8399. PANAMÁ: Río Tecúmen, *Standley* 26682.

18. *Panicum frondescens* G. Meyer, Prim. Fl. Esseq. 56. 1818.

*Panicum olyraefolium* Raddi, Agrost. Bras. 43. pl. I. f. 6. 1823.

*Panicum ctenodes* var. *majus* Trin. Gram. Icon. 2: pl. 171. f. A. 1829.

*Panicum stoloniferum* var. *majus* Kunth, Rév. Gram. 2:389. 1831.

*Panicum kegelii* Steud. Syn. Pl. Glum. 1:65. 1854.

*Hymenachne frondescens* Fourn. Mex. Pl. 2:36. 1886.

Perennial; culms slender, ascending from a decumbent base, rooting at the nodes, branching, sparsely pilose, 15–60 cm. long; sheaths much shorter than the internodes, ciliate, more or less pilose in the throat, pubescent across the back on the collar; blades lanceolate, acuminate, mostly 5–11 cm. long, 8–15 mm. wide, narrowed at the more or less petiolate base, glabrous or minutely pubescent, the margins scabrous; panicles 4–11 cm. long, the usually numerous, crowded, densely flowered racemes 5–25 mm. long, finally spreading or even reflexed; spikelets about 2.7 mm. long, crowded, spreading, glabrous, the first glume acute, about one-third as long as the spikelet; fruit 1.5–1.6 mm. long, short-stipitate.

Shady river banks, swamps, and moist open ground, Mexico to Brazil.

BOCAS DEL TORO: *Carleton* 38; Pumpkin River, *von Wedel* 2575. CHIRIQUÍ: Puerto Armuelles, *Woodson & Schery* 858. COLÓN: Río Sirri, *Pittier* 4027. SAN BLAS: Permé, *G. Proctor Cooper III* 288. CANAL ZONE: Margarita Swamp, *Maxon & Valentine* 7069; Frijoles, *Killip* 4354.

19. *Panicum milleflorum* Hitchc. & Chase, Contr. U. S. Nat. Herb. 17:494. f. 70. 1915.

Perennial; culms erect or sometimes geniculate, as much as 2 m. high, glabrous, the nodes pubescent; sheaths shorter than the internodes, sparsely to rather densely papillose-pilose, densely pubescent on the collar; ligule obsolete or nearly so; blades acuminate, 15–35 cm. long, 12–20 mm. wide, sparsely pilose, the margins scabrous; panicles 25–45 cm. long, the densely flowered branches papillose-pilose, the lower ones in rather distant fascicles, ascending with numerous short branchlets, the upper ones simple, spreading; spikelets 1.3 mm. long.

Swampy places, British Honduras; Panama to Brazil.

CANAL ZONE: between Mindi and Colón, *Hitchcock* 7942; Frijoles, *Hitchcock* 8387 (TYPE); Juan Mina, *Bartlett & Lasser* 16886.

20. *Panicum pilosum* Swartz, Prodr. Veg. Ind. Occ. 22. 1788.

*Panicum distichum* Lam. Encycl. 4:731. 1798.

*Panicum pilisparsum* G. Meyer, Prim. Fl. Esseq. 57. 1818.



- Panicum trichophorum* Schrad. ex Schult. Mant. 2:247. 1824.  
*Setaria disticha* Humb. ex Spreng. Syst. Veg. 1:305. 1825.  
*Panicum densiflorum* Willd. ex Spreng. Syst. Veg. 1:320. 1825.  
*Setaria pilosa* Kunth, Rév. Gram. 1:47. 1829.  
*Setaria meyeri* Kunth, Rév. Gram. 1:47. 1829.  
*Setaria schraderi* Kunth, Rév. Gram. 1:47. 1829.

Perennial; culms erect or decumbent at the base and rooting at the lower nodes, 25–60 cm. or sometimes as much as 1 m. long, branching, the nodes glabrous; sheaths longer than the internodes, the margins papillose-ciliate at least toward the summit; ligule wanting; blades 5–20 cm. long, 6–10 mm. wide (rarely as much as 15 mm.), widest at the cordate base, glabrous on the lower surface, sparsely hispid on the upper, the margins scabrous; panicles erect, 5–15 cm. long, the branches simple, 1–4 cm. long, usually stiffly and abruptly spreading, the rachis papillose-hispid, the hairs sometimes sparse; spikelets 1.3–1.5 mm. long, crowded.

Swamps, wet ground and open woods, Mexico and the West Indies to Brazil.

CHIRIQUÍ: David, *Hitchcock* 8347. COLÓN: Catival, *Standley* 30313; Porto Bello, *Pittier* 2481. SAN BLAS: Puerto Obaldía, *Pittier* 4371. CANAL ZONE: Gatún, *Hitchcock* 8029; Frijoles, *Hitchcock* 8396; *Piper* 5222; *Standley* 27535; *Killip* 1213; Barro Colorado Island, *Standley* 40830; Ancón Hill, *Seibert* 373; Balboa, *Hitchcock* 8061. PANAMÁ: Chorrera, *Hitchcock* 8139; Quebrada La Palma and Cañon of Río Chagres, *Dodge & Allen* 17350; Chepo, *Hunter & Allen* 14; Taboga Island, *Standley* 27895; *Hitchcock* 8083.

21. PANICUM POLYGONATUM Schrad. ex Schult. Mant. 2:256. 1824.

- Panicum potamium* Trin. Gram. Pan. 239. 1826.  
*Setaria polygonata* Kunth, Rév. Gram. 1:47. 1829.  
*Panicum pilosum* var. *polygonatum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:211. 1877.  
*Panicum bourgaei* Fourn. Mex. Pl. 2:25. 1886.

Perennial; culms slender, widely decumbent-spreading, branching, the nodes pubescent, rooting at the lower nodes, the internodes usually rather short; sheaths shorter than the internodes, glabrous, the margins ciliate; ligule about 0.3 mm. long, membranaceous, erose; blades rather thin, cordate, mostly 5–8 cm. long, 5–10 mm. (rarely 15 mm.) wide, glabrous or sparsely pilose; panicles 6–15 cm. long, the usually numerous branches ascending, the branchlets appressed or spreading, mostly on the lower side of the branches; spikelets 1.5 mm. long, glabrous.

Swamps, ditches, muddy river banks, and wet thickets, southern Mexico (Chiapas) to Paraguay.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart* 73; *von Wedel* 1121; Bocas del Toro, *Carlton* 69a. COLÓN: Catival, *Standley* 3021. SAN BLAS: Permé, *G. Proctor Cooper* III 268. CANAL ZONE: Mindi and Colón, *Hitchcock* 7943; Gatún, *Hitchcock* 9172; between Bohio and Frijoles, *Hitchcock* 8395; Juan Mina, *Bartlett & Lasser* 16770; between Gorgona and Tabernilla, *Hitchcock* 7965; Gamboa, *Heriberto* 66. PANAMÁ: Pinogana, *Pittier* 6576; Río Tecúmen, *Killip* 4316.

22. PANICUM LAXUM Swartz, Prodr. Veg. Ind. Occ. 23. 1788.

- Panicum agrostidiforme* Lam. Tabl. Encycl. 1:172. 1791.  
*Panicum tenuiculme* G. Meyer, Prim. Fl. Esseq. 58. 1818.  
*Panicum leptomerum* Presl, Rel. Haenk. 1:311. 1830.  
*Panicum diandrum* Kunth, Rév. Gram. 2:393. 1831.



*Panicum ramuliflorum* Hochst. ex Steud. Syn. Pl. Glum. 1:65. 1854.

*Agrostis nigrescens* Salzm. ex Steud. Syn. Pl. Glum. 1:65. 1854.

*Panicum pilosum* var.  $\beta$ . *epilosum* Fourn. Mex. Pl. 2:24. 1886.

Perennial; culms geniculate-ascending or decumbent at the base and rooting at the nodes, 15–100 cm. long, branching, glabrous; sheaths mostly shorter than the internodes, nearly glabrous to papillose or papillose-hispid, especially near the summit, with a dense pubescent line on the collar, the margins usually densely ciliate; blades mostly 5–12 cm. long, sometimes longer, 5–10 mm., or rarely to 15 mm., wide, rounded or subcordate at the base, the lower surface nearly smooth, the upper scaberulous, sometimes sparsely pilose, the margins usually scabrous; panicle 5–30 cm. long, composed of several to many slender raceme-like branches, the lower ones rather distant, spreading, the upper ascending, successively shorter; branchlets secund on the lower side of the branches, densely flowered; spikelets 1–1.5 mm. long, the first glume about half as long.

Forests, river banks, along ditches, and moist places, Mexico and the West Indies to Paraguay.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart 86*; Bocas del Toro, *Carleton 69*. CHIRIQUÍ: David, *Hitchcock 8346, 8350*; Dolega, *Hitchcock 8334*. COCLÉ: Olá, *Pittier s. n.* COLÓN: Porto Bello, *Pittier 2443*. CANAL ZONE: Fort Randolph, *Standley 28534*; Gatún, *Hitchcock 7968, 8027*; Darién Station, *Standley 31510*; Gamboa, *Pittier 4789*; Empire to Mandinga, *Piper 5251*; Culebra, *Hitchcock 7900*; *Standley 25995*; between Fort Clayton and Corozal, *Standley 29098*; between Pedro Miguel and Corozal, *Hitchcock 7993*; Ancón, *Killip 4113*. PANAMÁ: Quebrada La Palma and Cañon of Río Chagres, *Dodge & Allen 17351*; Chorrera, *Hitchcock 8134*; Chepo, *Pittier 4615*; between Pacora and Chepo, *Woodson, Allen & Seibert 1632*; Río Tecúmen, *Standley 26663*. DARIÉN: Sambú River, *Pittier 5234*.

23. *Panicum BOLIVIENSE* Hack. Repert. Sp. Nov. (Fedde) 11:19. 1912.

Perennial; culms as much as 1.5 m. long, decumbent-spreading, rooting at the lower nodes, the nodes glabrous (rarely minutely pubescent); ligule a ciliate membrane, about 0.5 mm. long; sheaths glabrous or papillose-hispid toward the summit, the margins ciliate or nearly glabrous; blades 5–15 cm. long (rarely to 20 cm.), 7–20 mm. wide, acuminate, cordate at the base, glabrous on both surfaces, the margins very scabrous; panicles 10–25 cm. long, loosely flowered, the branchlets spreading, usually secund on the lower side of the ascending branches; spikelets 1.5–1.6 mm. long, glabrous, the first glume acute, about half the length of the spikelet; fruit 1.4 mm. long, subacute.

Ditches, marshy stream banks, and wet open ground or open woods, Mexico (Veracruz) and Cuba to Paraguay.

BOCAS DEL TORO: Changuinola Valley, *Dunlap 184*. COCLÉ: El Valle de Antón, *Seibert 485*; *Martin 3032*. PANAMÁ: Panamá, *Hitchcock 8400*; La Jagua, *Bartlett & Lasser 16988*.

24. *Panicum STAGNATILE* Hitchc. & Chase, Contr. U. S. Nat. Herb. 17:528. 1915.

*Panicum bernoullianum* Mez, Bot. Jahrb. (Engler) 56: Beibl. 125:3. 1921.

Perennial; culms erect from a decumbent base, rooting at the lower nodes,



simple or sparingly branched, 1–2 m. long, the nodes glabrous or sparsely pubescent; lower sheaths usually much shorter than the internodes, the upper ones sometimes overlapping, the margins ciliate, more or less hispid at the throat; ligule membranaceous, less than 1 mm. long; blades 20–25 cm. long, 1.5–3 cm. wide, acuminate, gradually narrowed from below the middle, rounded at the base, glabrous on both surfaces, the margins scabrous; panicles 20–40 cm. long, finally exerted, the branches approximate, stiffly ascending, the lower ones 8–12 cm. long, the branches stiffly divergent; spikelets 1.8 mm. long, short-pedicellate, acute, glabrous; first glume acute, one-third to half as long as the spikelet, the second shorter than the fruit; fruit 1.6 mm. long, acute, the margins inrolled only at the base.

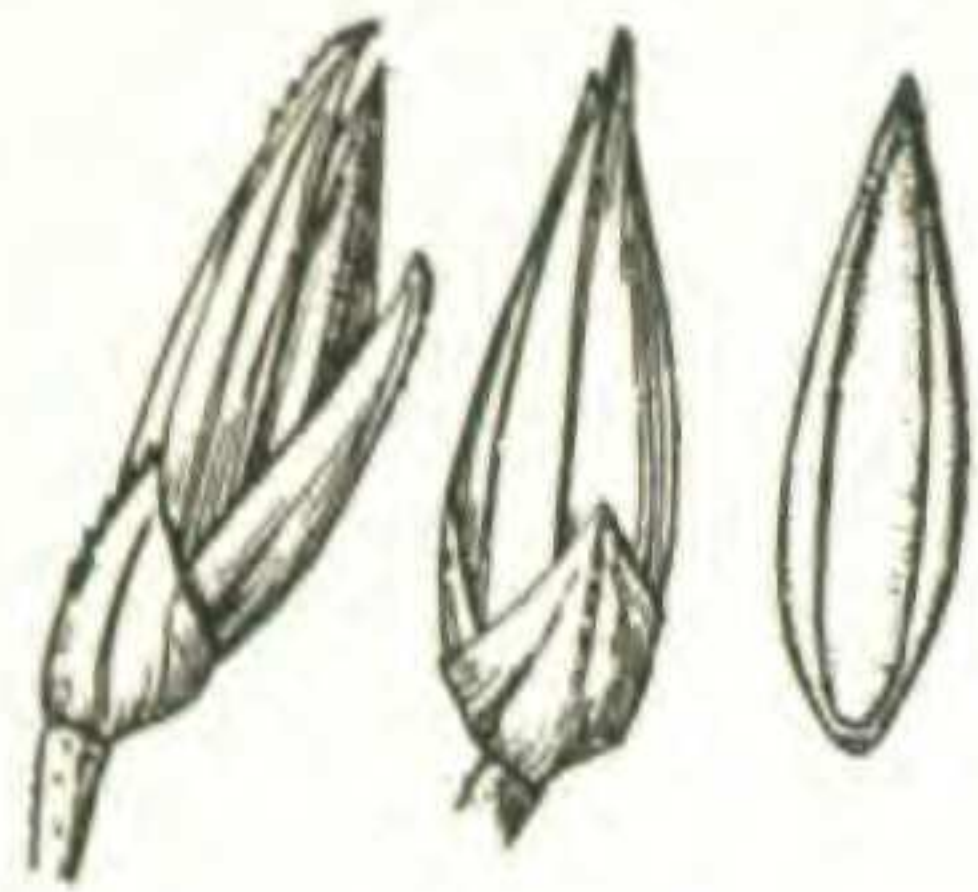


Fig. 23  
*Panicum stagnatile*

Swamps, growing in water, Mexico (Tabasco) to Panama.

BOCAS DEL TORO: Isla Colón, *von Wedel 1288*; Little Bocas, *von Wedel 2486*. CANAL ZONE: Frijoles, *Hitchcock 8388* (TYPE).

25. PANICUM PYRULARIUM Hitchc. & Chase, Contr. U. S. Nat. Herb. 17:508. 1915.

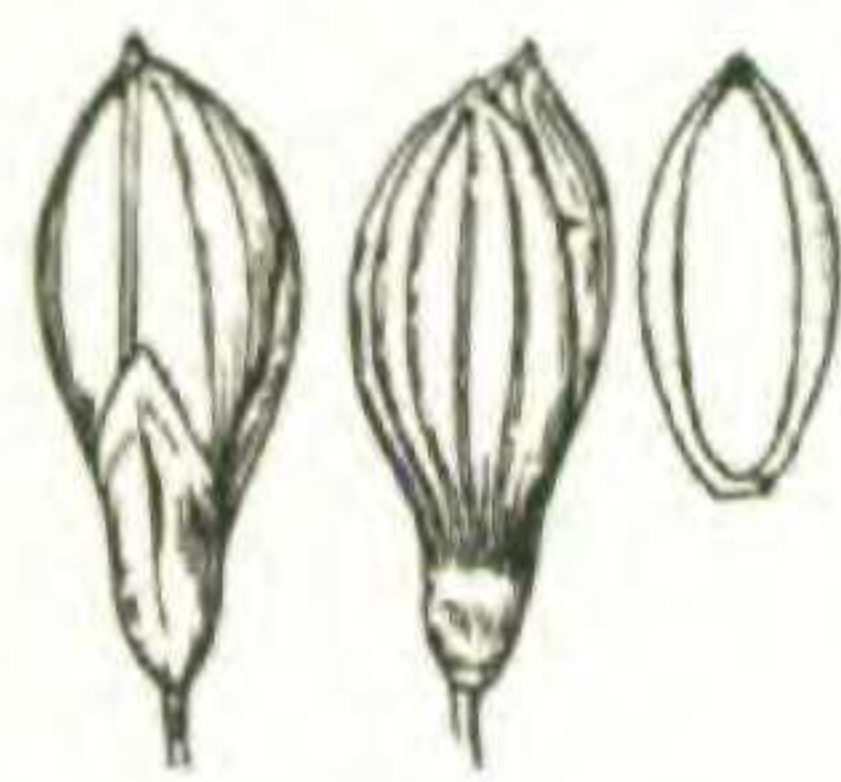


Fig. 24  
*Panicum pyrularium*

Annual; culms delicate, 10–30 cm. long, finally decumbent and branching, often rooting at the nodes, more or less zigzag, the nodes glabrous or sparsely pilose; blades 1–3 cm. long, 2–7 mm. wide, rather thin, clasping at the base, subacute, glabrous or sparsely pilose, the margins scabrous; panicles 2–5 cm. long, oval or pyramidal, the delicate flexuous branches spreading or reflexed; spikelets 1.5 mm. long, turgid, pyriform, attenuate at the base, glabrous, the first glume acute, about half as long as the spikelet; fruit 1 mm. long, turgid.

CHIRIQUÍ: between Hato del Jobo and Cerro Vaca, *Pittier 5416* (TYPE). Known only from the type collection.

26. PANICUM HAENKEANUM Presl, Rel. Haenk. 1:304. 1830.

*Panicum costaricense* Hack. Oesterr. Bot. Zeitschr. 51:428. 1901.

Perennial; culms relatively slender, straggling, sparingly to rather freely branching, sometimes rooting at the lower nodes, mostly about 1 m. long, pilose at least below the nodes; sheaths usually much shorter than the internodes, papillose-hispid especially toward the summit, densely pubescent on the collar; blades 5–10 cm. long, 6–12 mm. wide, acuminate, somewhat narrowed toward the more or less rounded base, pilose on the lower surface especially along the midnerve, papillose-hispid on the upper surface; panicles 10–15 cm. long, oblong, the slender flexuous spreading branches in rather distant fascicles; spikelets 2.3–2.5 mm. long on long or rather short capillary flexuous pedicels, sparsely pilose on the margins of the glumes and sterile lemma, the first glume about half as long as the spikelet; fruit 1.7 mm. long, smooth and shining.



Open woods and usually moist grassy banks, southern Mexico to Venezuela.

CHIRIQUÍ: San Felix, *Pittier* 5247. CANAL ZONE: Culebra, *Hitchcock* 9168; Pedro Miguel, *Killip* 4309; Ancón Hill, *Piper* 5266; *Killip* 4183; between Corozal and Ancón, *Pittier* 2169, 2636; between Panamá and Corozal, *Hitchcock* 9206. PANAMÁ: Pacora, *Killip* 4237; Aguarubia, *Killip* 4282; Campana, *Allen* 1317.

27. PANICUM TRICHOIDES Swartz, Prodr. Veg. Ind. Occ. 24. 1788.

*Panicum capillaceum* Lam. Tabl. Encycl. 1:173. 1791.

*Panicum capillaceum* var.  $\beta$ . *strictius* Doell in Mart. Fl. Bras. 2<sup>2</sup>:249. 1877.

Annual; culms slender, freely branching, decumbent-spreading or creeping, 15–60 cm. long, the branches ascending; sheaths shorter than the internodes or the upper ones overlapping, papillose-hispid with spreading hairs; blades 4–7 cm. long, 8–15 mm. wide, ovate or ovate-lanceolate, thin, more or less pilose, the margins ciliate toward the base; panicles 5–20 cm. long, more or less included in the upper sheath, the slender branches ascending or spreading, the branchlets and pedicels of the spikelets capillary, divergent; spikelets 1.5 mm. long, sparsely pilose or nearly glabrous, the fruit exposed at the summit, the first glume about half as long as the spikelet.

Woods, open ground and waste places, especially along trails, Mexico and the West Indies to Peru and Brazil.

BOCAS DEL TORO: Lincoln Creek, *Carleton* 130, 191; Water Valley, *von Wedel* 2661. CHIRIQUÍ: Puerto Armuelles, *Woodson* & *Schery* 865. SAN BLAS: Permé, *G. Proctor Cooper III* 269. COLÓN: Cative, *Standley* 30255. CANAL ZONE: Río Pequení, *Woodson, Allen* & *Seibert* 1621; Frijoles, *Piper* 5244; *Killip* 12127; Culebra, *Pittier* 2083; *Hitchcock* 7933; Ancón Hill, *Killip* 4207; Las Cruces Trail, *Hunter* & *Allen* 727. PANAMÁ: Matías Hernández, *Pittier* 6761, 6854; Panamá, *Killip* 4190; Chepo, *Pittier* 4696; Taboga Island, *Standley* 27028; *Killip* 4139. DARIÉN: Boca de Cupe, *Allen* 878.

28. PANICUM TRICHANTHUM Nees, Agrost. Bras. 210. 1829.

*Panicum guayaquilense* Steud. Syn. Pl. Glum. 1:85. 1854.

Perennial; culms straggling or clambering, geniculate, branching, rooting at the nodes, mostly 1–2 m. long; sheaths shorter than the internodes, glabrous, often ciliate on the margins; blades 8–15 cm. long, 1–2 cm. wide, lanceolate, acuminate, often asymmetrical, rounded or subcordate at the base, sparsely pilose, more or less ciliate, at least near the base; panicles mostly 20–30 cm. long, diffuse, the branches rather stiffly spreading or even reflexed at maturity, the branchlets becoming implicate; spikelets 1.2–1.5 mm. long on long slender spreading pedicels, glabrous, the first glume about one-fifth as long as the spikelet.

River banks, lake shores, moist thickets and swampy places, Mexico and the West Indies to Paraguay.

BOCAS DEL TORO: Isla Colón, *von Wedel* 1306; Old Bank Island, *von Wedel* 1998; Water Valley, *von Wedel* 1449. CANAL ZONE: Frijoles, *Maxon* 4703; *Standley* 31477; *Killip* 4288; *Piper* 5242; Tabernilla, *Pittier* 3824; *Hitchcock* 8383; Culebra, *Hitchcock* 7895; Balboa, *Hitchcock* 8015. PANAMÁ: Matías Hernández, *Pittier* 6945; Abalaba, *Killip* 4283; Río Tecúmen, *Standley* 26679; Río Tapía, *Standley* 26154.

29. PANICUM SELLOWII Nees, Agrost. Bras. 153. 1829.

*Panicum lasianthum* Trin. Gram. Icon. 3: pl. 245. 1830.



*Panicum puberulum* Trin. Mém. Acad. St. Petersb. VI. Sci. Nat. 1:277. 1834.

*Panicum valenzuelanum* A. Rich. in Sagra, Hist. Cuba 11:304. 1850.

*Panicum rugulosum* var. *hirtiglume* Griseb. Cat. Pl. Cub. 233. 1866.

Perennial; culms 60 cm. to more than 1 m. long, branching, straggling, rooting at the lower nodes; sheaths glabrous or papillose-pilose, the margins ciliate at least toward the summit, the collar densely pubescent; blades 4–15 cm. long, 10–30 mm. wide, ovate-lanceolate, acuminate, usually asymmetrical, sparsely pilose or

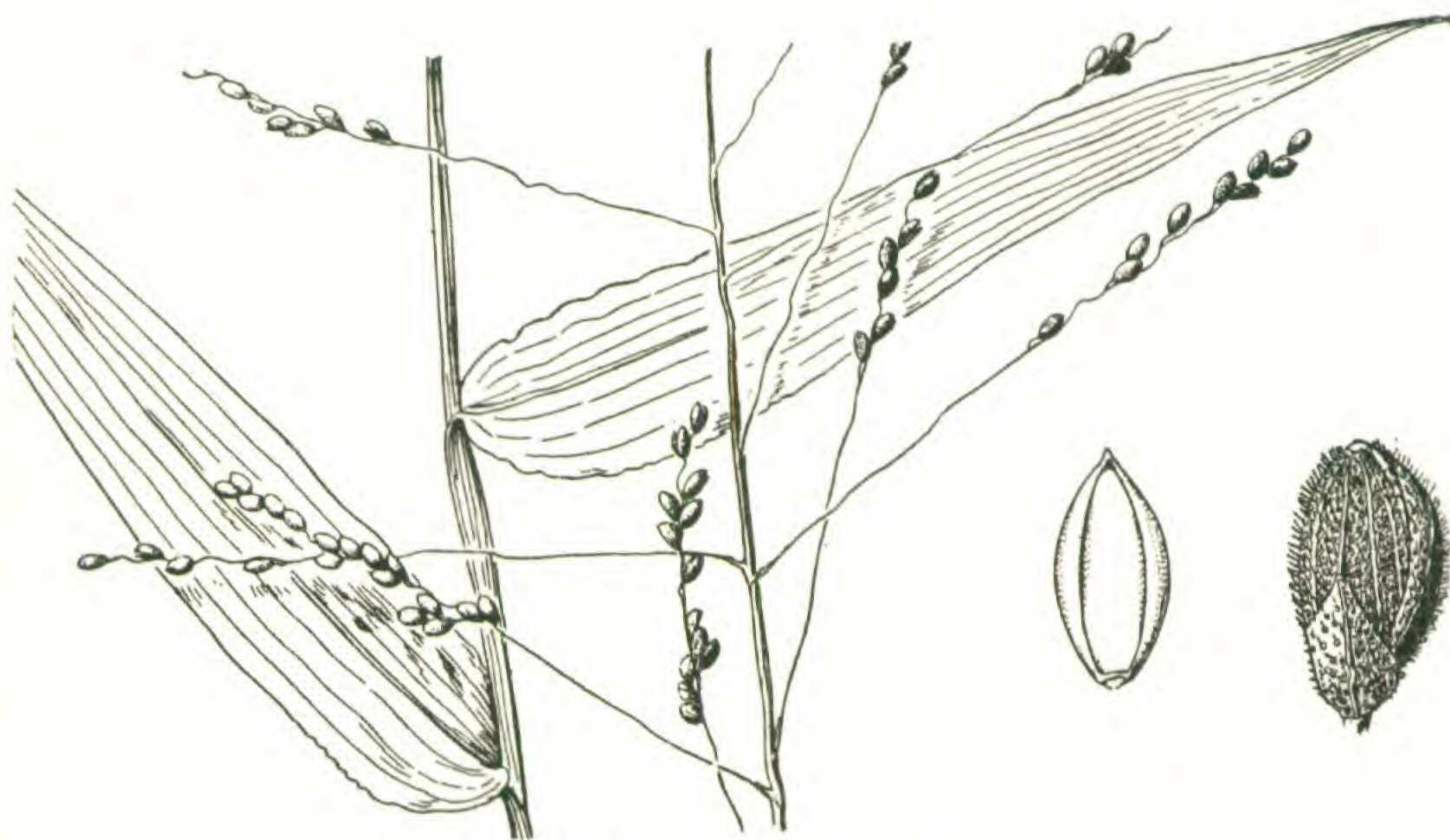


Fig. 25. *Panicum sellowii*

more or less softly pubescent, the margins very scabrous; panicles 10–20 cm. long, the branches ascending or spreading, naked in the lower half or two-thirds, densely pilose in the axils; spikelets short-pedicellate, appressed to the branchlets, appearing more or less clustered, 2 mm. long, obovate, obtuse, glabrous or sparsely papillose-hispid, the first glume rather narrow, acute or subobtuse, half to three-fourths as long as the spikelet.

Moist banks, woods, and brushy slopes, southern Mexico and the West Indies to Paraguay.

CHIRIQUÍ: El Boquete, *Hitchcock* 8299.

30. *Panicum arundinariae* Trin. ex Fourn. Mex. Pl. 2:25. 1886.

*Panicum virgultorum* Hack. Oesterr. Bot. Zeitschr. 51:369. 1901.

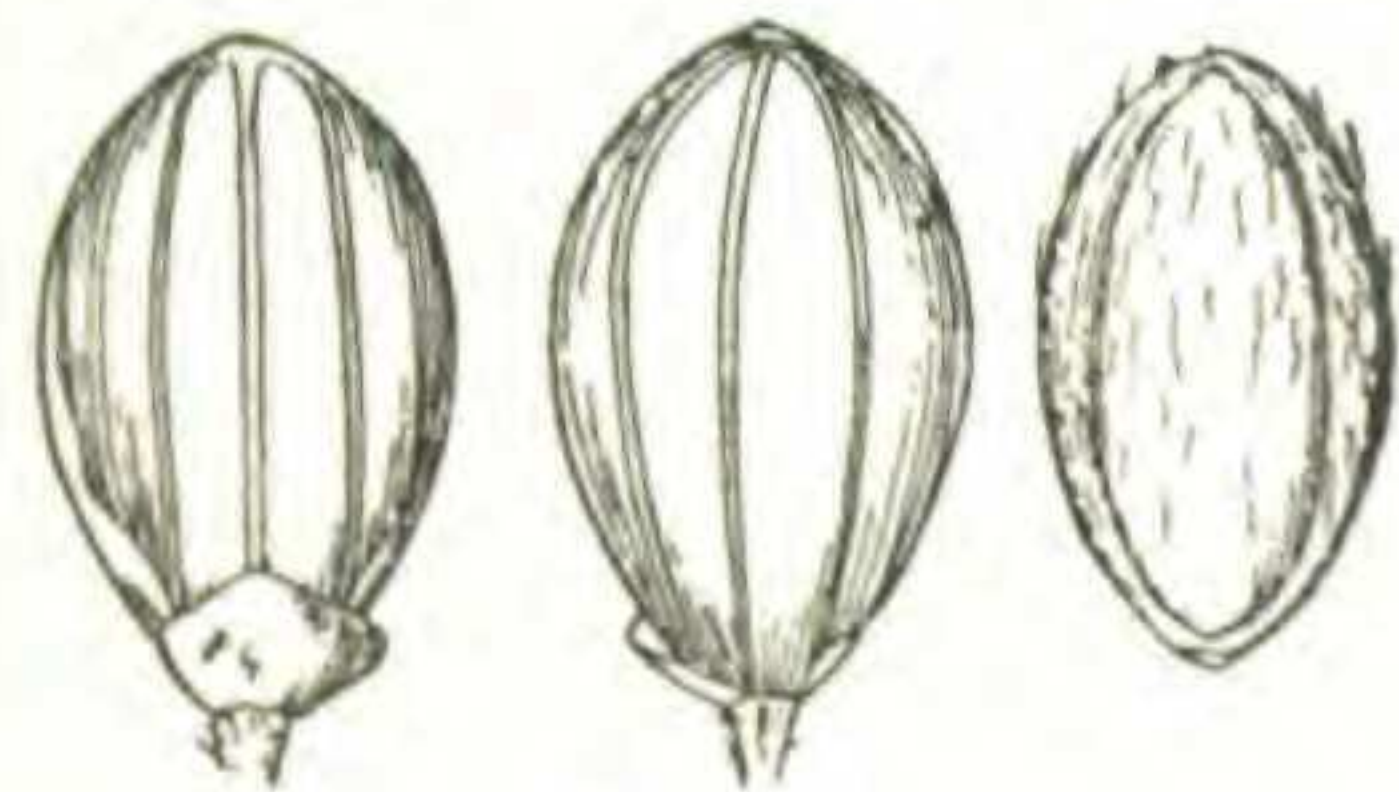


Fig. 26

*Panicum arundinariae*

Perennial; culms clambering or straggling, 0.5–1.5 m. long, freely branching, glabrous or very sparsely pubescent; sheaths shorter than the internodes, glabrous, densely pubescent on the collar; blades lanceolate, 4–15 cm. long, 5–12 mm. wide, glabrous on the lower surface, scabrous and sparsely papillose-hispid on the upper, the margins very scabrous; panicles mostly 4–8 cm. long (rarely as much as 15 cm., those of the branches



often much reduced), the branches narrowly ascending to spreading, the lower rarely more than 5 cm. long, densely flowered, sometimes naked at the base; spikelets 1.5 mm. long, oval, the first glume minute, nerveless; fruit oval, smooth and shining, sparsely pilose with long appressed hairs.

In brush on rocky slopes, along fences, and in moist forests, Mexico (Veracruz) to Panama.

CHIRIQUÍ: El Boquete, *Hitchcock* 8317.

31. *Panicum schiffneri* Hack. *Ergeb. Bot. Exped. Akad. Wiss. Südbras.* 11. 1906.

Perennial; culms mostly 1–2 m., sometimes as much as 3 m. long, straggling or clambering, rather woody, freely branching, rooting at the nodes, retrorsely pilose, especially below the nodes, or sometimes nearly glabrous; sheaths much shorter than the internodes, pilose or papillose-pilose; blades 5–15 cm. long, 1–2.5 cm. wide, lanceolate, acuminate, somewhat asymmetrical, sparsely pilose, the margins scabrous; panicles pyramidal, 10–15 cm. long, nearly as wide, the branches ascending to spreading, at least some of the branches naked at the base; spikelets 1.5 mm. long, elliptic, densely clustered on the short branchlets, glabrous, the first glume minute, nerveless; fruit 1.5 mm. long, sparsely pilose with long silky hairs.

Wet shady banks, often clambering in brush, southern Mexico (Veracruz) and the West Indies to Brazil.

CHIRIQUÍ: El Boquete, *Hitchcock* 8278, 8305.

32. *Panicum cordovense* Fourn. *Mex. Pl.* 2:26. 1886.

*Panicum expansum* Fourn. *Mex. Pl.* 2:26. 1886.

*Ichnanthus apiculatus* Scribn. *U. S. Dept. Agr. Div. Agrost. Circ.* 30:1. 1901.

Perennial; culms as much as 2 m. long, rather slender, widely spreading or straggling, rooting at the nodes, branching, the branches elongate; sheaths much shorter than the internodes, sparsely to rather densely papillose or papillose-hispid, the margins densely ciliate; blades 5–15 cm. long, 5–10 mm. wide, narrowly lanceolate, acuminate, rounded at the base, sparsely hispid, the midnerve and margins white, very scabrous; primary branches 8–20 cm. long, loosely flowered, the branches ascending or spreading, some long, some short in the same fascicle, the secondary panicles terminal on the branches and branchlets, narrow, much reduced, partly enclosed in the sheath; spikelets 3–3.5 mm. long, usually paired, the pairs rather distant, glabrous or pustulose-pubescent, the first glume subobtusate, two-thirds to three-fourths as long as the spikelet.

Open or brushy slopes and shady woods, Mexico (Veracruz) to Brazil and Bolivia.

CHIRIQUÍ: Volcán Chiriquí, *Hitchcock* 8196; El Boquete, *Hitchcock* 8271, 8275, 8303, 8328.

33. *Panicum pantrichum* Hack. *Verh. Zool. Bot. Ges. Wien.* 1915:72. March, 1915.

*Panicum chiriquiense* Hitchc. & Chase, *Contr. U. S. Nat. Herb.* 17:527. f. 138. July, 1915.



*Panicum protractum* Mez, Notizbl. Bot. Gart. Berlin 7:77. 1917.

Perennial; culms as much as 80 cm. long, straggling, rooting at the nodes, the ascending branches 20–30 cm. high, papillose or papillose-pilose; sheaths overlapping or somewhat shorter than the internodes, densely papillose-pilose with usually spreading hairs; blades 2–7 cm. long, 7–10 mm. wide, acuminate, rounded at the base, densely pubescent or pilose on both surfaces; panicles 2.5–3.5 cm. long, or the primary ones as much as 10 cm. long, the branches stiffly ascending, villous; spikelets 2.7 mm. long, pubescent, the first glume three-fourths as long as the spikelet; fruit 2.1 mm. long, minutely apiculate.

Shady hillsides, Panama to Brazil.

CHIRIQUÍ: El Boquete, *Hitchcock* 8313 (TYPE); Bajo Boquete, *Killip* 456.

34. PANICUM STENODOIDES F. T. Hubb. Proc. Amer. Acad. 49:497. 1913.

Perennial; culms 20–40 cm. high, densely tufted, slender, erect with slender leafless panicle-bearing branches from the upper nodes; sheaths papillose-pilose or nearly glabrous, the lowermost bladeless, becoming fibrous; ligule scarcely 0.5 mm. long, membranaceous, minutely ciliate; blades 3–8 cm. long, 1–2 mm. wide, involute at least toward the tip, papillose-pilose or sometimes glabrous; panicles about 1 cm. long, narrow, short-exserted, bearing 3–7 appressed spikelets; spikelets 2–2.1 mm. long, attenuate at the base, the first glume acute, about half as long as the spikelet; fruit 1.7 mm. long.

Moist wet open grassland, British Honduras, Costa Rica, Panama, Trinidad, and Brazil.

CANAL ZONE: Frijoles, *Killip* 4346; between Panamá and Corozal, *Hitchcock* 9207; Rio Azote Caballo, *Dodge*, *Steyermark* & *Allen* 16850. PANAMÁ: Chorrera, *Hitchcock* 8147.

35. PANICUM ALTUM Hitchc. & Chase, Contr. U. S. Nat. Herb. 17:488. f. 57. 1915.

Perennial; culms 2–4 m. long, stout, reed-like, tangled, decumbent and straggling at the base, glaucous, sometimes with erect sterile branches at the swollen nodes; sheaths smooth; blades 30–45 cm. long, 8–15 mm. wide, glabrous on both surfaces, the margins scabrous; panicles 20–30 cm. long, the slender scabrous branches fascicled, ascending to spreading, some of them naked at the base; spikelets 3.2–4 mm. long, short-pedicellate, turgid, glabrous, gaping, the first glume pointed, about two-thirds as long as the spikelet; fruit 2–2.2 mm. long.

Marshes near the seacoast, British Honduras to Trinidad.

PANAMÁ: Point Chamé, *Hitchcock* 8167 (TYPE).

36. PANICUM MAXIMUM Jacq. Coll. Bot. 1:76. 1786.

*Panicum polygamum* Swartz, Prodr. Veg. Ind. Occ. 24. 1788.

*Panicum laeve* Lam. Tabl. Encycl. 1:172. 1791.

*Panicum jumentorum* Pers. Syn. Pl. 1:83. 1805.

*Panicum scaberrimum* Lag. Gen. & Sp. Nov. 2. 1816.

*Panicum trichocondylum* Steud. Syn. Pl. Glum. 1:74. 1854.

Perennial with stout rhizomes; culms usually in large clumps, 1–2.5 m. high,



erect or sometimes geniculate at the lower nodes, the nodes usually densely hirsute; sheaths shorter than the internodes, papillose-hirsute or nearly glabrous; ligule 4–6 mm. long, densely ciliate; blades elongate, 1–2 cm. wide, narrowed toward the base, the margins very scabrous; panicles 20–45 cm. long, the branches ascending or spreading, somewhat drooping at maturity, in rather distant whorls, naked toward the base, pilose in the axils; spikelets 3 mm. long, acute, glabrous, the first glume obtuse, about one-third as long as the spikelet; fruit 2.3–2.5 mm. long, transversely rugose.

Introduced in America from Africa; Florida, Mexico, and the West Indies to Bolivia and Brazil. Commonly cultivated for forage, escaping in fields and waste places.

Guinea grass.

CANAL ZONE: Gamboa, *Standley 28490*; Culebra, *Hitchcock 7920*; Pittier 2088, 4806; Ancón Hill, *Maxon 6781*; Balboa, *Standley 25541, 25549*. PANAMÁ: Taboga Island, *Hitchcock 8080*.

37. *Panicum mertensii* Roth in Roem. & Schult. Syst. Veg. 2:458. 1817.

*Panicum altissimum* G. Meyer, Prim. Fl. Esseq. 63. 1818. Not *P. altissimum* DC 1817.

*Panicum megiston* Schult. Mant. 2:248. 1824.

*Panicum elatius* Kunth, Rév. Gram. 1:38. 1829.

*Panicum tuberculatum* Presl, Rel. Haenk. 1:307. 1830.

Perennial; culms 1–2 m. high., coarse, erect; sheaths shorter than the internodes, papillose or papillose-pilose toward the summit, nearly glabrous toward the base, somewhat auriculate; ligule membranaceous, truncate, 2–3 mm. long; blades 15–40 cm. long, 1.5–3 cm. wide, somewhat narrowed to a rounded base, glabrous on both surfaces, the margins scabrous; panicles 40–60 cm. long, the long, angular, nearly simple, ascending branches in dense rather distant verticils, pubescent and hispid in the axils, naked in the lower half; spikelets 3.5 mm. long, glabrous, short-pedicellate, paired, the pairs distant, the first glume acute, about one-third as long as the spikelet; fruit 2.8 mm. long, pointed, smooth and shining.

Marshes, moist woods and waste places, Mexico (Tabasco) and Cuba to Paraguay.

CANAL ZONE: Barro Colorado Island, *Kenoyer 123*; Empire, *Pittier 3726*; Bohio, *Hitchcock 7944*. PANAMÁ: Matías Hernández, *Pittier 6717*.

38. *Panicum grande* Hitchc. & Chase, Contr. U. S. Nat. Herb. 17:529. f. 143. 1915.

Stoloniferous perennial; culms 1.5–2 m. high, erect from a long decumbent base, 1–2 cm. thick, simple or sparingly branched, the nodes densely appressed-hirsute; sheaths mostly longer than the internodes, papery or somewhat succulent, sparsely hispid at the throat; ligule membranaceous, about 2 mm. long; blades of the midculm as much as 1 m. long, 6 cm. wide, the upper and lower one smaller, the margins serrulate; panicles 30–60 cm. long, 10–40 cm. wide, the axis rather deeply furrowed, the branches stiffly ascending, naked at the base, the lower ones whorled, mostly 20–30 cm. long; spikelets 2.5 mm. long, short-pedicellate, ap-



pressed to the branchlets, pointed, glabrous, the first glume acute, a little more than half as long as the spikelet; fruit 1.8 mm. long, obovate, smooth and shining.

Swamps, often growing in large masses in water, Nicaragua and Trinidad to Venezuela.

COLÓN: Catival, *Standley 30391*. CANAL ZONE: Gatún, *Hitchcock 9178* (TYPE); Juan Mina, *Bartlett & Lasser 16751, 16879*; Gamboa, *Standley 28495*; Sambú River, *Pittier 5546*. PANAMÁ: Río Chagres, *D. H. Popenoe 38*; *Piper 5241*; Río Tecúmen, *Standley 26517*.

39. PANICUM ZIZANIOIDES H.B.K. Nov. Gen. & Sp. 1:100. 1815.

*Panicum oryzoides* Swartz, Prodr. Veg. Ind. Occ. 23. 1788. Not *P. oryzoides* Ard., 1764.

*Panicum pseudoryzoides* Steud. Syn. Pl. Glum. 1:75. 1854.

*Acroceras oryzoides* Stapf in Prain, Fl. Trop. Afr. 9:622. 1920.

*Acroceras zizanioides* Dandy, Jour. Bot. Brit. & For. 69:54. 1931.

Perennial; culms 50 cm. to as much as 2 m. long, decumbent-spreading, rooting at the nodes, the lower internodes short; sheaths mostly shorter than the internodes, glabrous or papillose-hispid toward the summit; hispid in the throat, the margins ciliate; ligule about 0.5 mm. long, membranaceous; blades 4–15 cm. long, 8–30 mm. wide, acuminate, cordate, the margins very scabrous; panicles 10–25 cm. long, the few rather distant branches stiffly ascending or spreading, nearly simple; spikelets paired, rather short-pedicellate, appressed, 5.5–6 mm. long, glabrous; first glume broad, clasping, about two-thirds as long as the spikelet; second glume and sterile lemma equal, laterally compressed and keeled at the summit; fruit 4.7–5 mm. long, smooth and shining, laterally compressed at the summit forming a small crest.

Woods, swamps, and moist open ground, Mexico (Veracruz) and the West Indies to Paraguay.

BOCAS DEL TORO: Pumpkin River, *von Wedel 2579*; Changuinola Valley, *Dunlap 202, 230*. CHIRIQUÍ: David, *Hitchcock 8351*. COLÓN: Río Sirri, *Pittier 4026*. CANAL ZONE: Barro Colorado Island, *Kenoyer 121*; Juan Mina, *Bartlett & Lasser 16411, 16525, 16750*; Gamboa, *Pittier 3781, 4790*; Tabernilla, *Hitchcock 8112, 8385*; Fort Kobe road, *Woodson, Allen & Seibert 1413*; Balboa, *Standley 25440, 29253*. PANAMÁ: La Jagua, *Bartlett & Lasser 16389, 16987, 16991*; Taboga Island, *Killip 4137*.

54. ICHNANTHUS Beauv.

ICHNANTHUS Beauv. Ess. Agrost. 56. pl. 12. f. 1. 1812.

Spikelets paniculate or arranged on one-sided racemes or raceme-like branches; first glume acuminate, often nearly as long as the spikelet; second glume and sterile lemma subequal, pointed beyond the fruit, usually acuminate; fruit acute or subacute, the margins of the lemma usually flat, the rachilla disarticulating at the base of the segment, remaining attached to the fruit as a short stipe, this bearing on either side membranaceous appendages adnate to the base of the lemma, the appendages or wings often much reduced or indicated only by scars.

Annuals or perennials of varying habit with relatively broad flat blades and terminal and axillary inflorescences.



- a. Blades 1-6 cm. long, ovate to ovate-lanceolate, thin; plants annual, the culms very slender and rather weak.
- b. Inflorescences exerted on long slender peduncles, the branches usually spreading; blades 4-10 mm. wide, the margins not undulate; spikelets sparsely pilose. Plants forming dense soft mats..... 1. *I. TENUIS*
- bb. Inflorescences short-exserted, or only the terminal long-exserted, the axillary ones usually partly enclosed in the sheaths, the branches appressed; blades 1-2 cm. wide, the margins undulate; spikelets glabrous..... 2. *I. NEMOROSUS*
- aa. Blades, or at least most of them, more than 6 cm. long, relatively firm, plants perennial, the culms stouter, sometimes clambering in brush.
- b. Blades ovate to ovate-lanceolate, 1.5-3.5 cm. wide; nodes villous; racemes approximate, stiffly ascending, the lower ones 2-4 cm. long... 3. *I. AXILLARIS*
- bb. Blades lanceolate, 5-15 mm. wide; nodes glabrous or nearly so; racemes relatively distant, the lower ones spreading, as much as 7 cm. long..... 4. *I. PALLENS*

1. *ICHNANTHUS TENUIS* (Presl) Hitchc. & Chase, Contr. U. S. Nat. Herb. 18:334. 1917.

*Oplismenus tenuis* Presl, Rel. Haenk. 1:319. 1830.

*Panicum exile* Steud. Nom. Bot. ed. 2. 2:256. 1841.

*Panicum alsinoides* Griseb. Fl. Brit. W. Ind. 550. 1864.

*Ichnanthus alsinoides* Munro ex Hemsl. Biol. Centr.-Amer. Bot. 3:500 1885.

Annual; culms forming large loose mats, very slender, elongate, decumbent or creeping, rooting at the nodes, freely branching, the erect or ascending branches 10-40 cm. long, pubescent or pilose, rarely nearly glabrous; sheaths usually much shorter than the internodes, pilose or papillose-pilose with spreading hairs; blades ovate to ovate-lanceolate or lanceolate, 1-5 cm. long, 4-10 mm. wide, thin, glabrous to pubescent and sparsely pilose; inflorescences terminal and axillary, long-exserted on slender peduncles, composed of 2 to several slender to spreading racemes, pubescent or pilose in the axils, the lower ones 1-3 cm. long; spikelets 3-4 mm. long, appressed, sparsely pilose, especially on the margins of the glumes and sterile lemma; first glume acuminate or attenuate, almost aristate, two-thirds to nearly as long as the spikelet; second glume and sterile lemma acuminate, equal or the glume a little longer, extending beyond the fruit; fruit 2-2.5 mm. long, oblong-elliptic, the wings reduced to inconspicuous scars.

The spikelets are frequently proliferous and sterile, composed of few to several herbaceous lemmas.

Moist forests, thickets, and shady places, British Honduras and Trinidad to Colombia and Brazil.

BOCAS DEL TORO: Laguna de Chiriquí, *von Wedel 1122*; Water Valley, *von Wedel 1781, 1857*. CHIRIQUÍ: El Boquete, *Hitchcock 8274*; Cerro Vaca, *Pittier 5366, 5370*. CANAL ZONE: France Field, *Maxon & Valentine 7077*; Chagres, *Fendler 373*; Gatún, *Hitchcock 9186*; between Bohío and Frijoles, *Hitchcock 8394*; Barro Colorado Island, *Kenoyer 107*; Obispo, *Standley 31771*; Culebra, *Hitchcock 9166, 9167*; *Pittier 2119*; Summit, *D. H. Popenoe 2*; Ancón Hill, *Killip 4029, 4208*; *Standley 26383*; Las Cruces Trail, *Cornman 2609*; Balboa, *Hitchcock 8000*; *Standley 25608*. PANAMÁ: Chivi Chivi Trail, *Cornman 4314*; Río Indio, *Dodge & Allen 17296*; Río Tecúmen, *Standley 29441*. Without locality, *Haenke* (TYPE).

2. *ICHNANTHUS NEMOROSUS* (Swartz) Doell in Mart. Fl. Bras. 2<sup>2</sup>:289. 1877.

*Panicum nemorosum* Swartz, Prodr. Veg. Ind. Occ. 22. 1788.



*Milium nemorosum* Moench, Meth. Pl. Suppl. 67. 1802.

*Echinolaena nemorosa* Kunth, Rév. Gram. 1:54. 1829.

Annual; culms slender, weak, decumbent-spreading, rooting at the nodes, 15–50 cm., or sometimes as much as 1 m. long, with relatively long internodes, villous in a line on one side, otherwise glabrous or nearly so; sheaths much shorter than the internodes except on young shoots, densely villous on the margins, glabrous or sparsely pilose on the back; blades ovate or ovate-lanceolate, acute or acuminate, asymmetric at the somewhat clasping base, 2–6 cm. long, 1–2 cm. wide, thin, with undulate margins, finely cross-veined, glabrous or sparsely hirsute on both surfaces, the margins finely scabrous; inflorescences terminal and axillary from the upper sheaths, the terminal rather long-exserted, the axillary usually partly enclosed, narrow, few-flowered, the branches short, appressed, or rarely spreading, villous in the axils; spikelets 3–3.5 mm. long, short-pedicellate, appressed, glabrous; first glume acute or acuminate, half to two-thirds as long as the spikelet, sometimes with an awn-point equalling or slightly exceeding the spikelet; second glume acuminate, slightly longer than the acute sterile lemma, the latter enclosing a well developed palea; fruit 2 mm. long, yellowish at maturity, wingless.

Forests and shady places, the West Indies and Guatemala to Panama.

BOCAS DEL TORO: Isla Colón, *von Wedel 1350*. CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock 8195*; El Boquete, *Hitchcock 8329*; Monte Lirio, *Seibert 313*.

3. *ICHNANTHUS AXILLARIS* (Nees) Hitchc. & Chase, Contr. U. S. Nat. Herb. 18:334. 1917.

*Panicum axillare* Nees, Agrost. Bras. 141. 1829.

Perennial; culms decumbent-spreading, rooting at the nodes, sometimes clambering in brush, as much as 1–1.5 m. long, the erect or ascending shoots or branches mostly 10–20 cm. long, glabrous or sparsely pubescent, the nodes villous; sheaths much shorter than the internodes, or overlapping on new shoots, usually densely villous; ligule truncate, about 1 mm. long; blades ovate or ovate-lanceolate, 3–9 cm. (sometimes 12 cm.) long, 1.5–3.5 cm. wide, acute, scabrous above, usually glabrous beneath; inflorescences terminal and axillary from the upper sheaths, partly included to long-exserted, rather dense, composed of few to numerous, stiffly ascending, approximate racemes, rather densely pubescent or pilose in the axils, the lower ones 2–4 cm. long; spikelets 3 mm. long, glabrous or sparsely pilose; glumes acuminate, scabrous on the keel, the first half to two-thirds as long as the spikelet; sterile lemma acute or subacuminate, a little shorter than the second glume, containing a well-developed palea and a staminate flower; fruit 1.8–2 mm. long, oblong-elliptic, with prominent scars at the base.

Moist forests, thickets, and banks at lower altitudes, Guatemala and the West Indies to Ecuador and Brazil.

CHIRIQUÍ: El Boquete, *Hitchcock 8276*; San Felix, *Pittier 5203*. CANAL ZONE: Fort Sherman, *Standley 31126*; Frijoles, *Hitchcock 9398*. PANAMÁ: Juan Díaz, *Killip 4063*; Río Tapia, *Standley 26144, 28146*.

4. *ICHNANTHUS PALLENS* (Swartz) Munro ex Benth. Fl. Hongk. 414. 1861.



*Panicum pallens* Swartz, Prodr. Veg. Ind. Occ. 23. 1788.

*Panicum hemignostum* Steud. Syn. Pl. Glum. 1:77. 1854.

Perennial; culms decumbent or prostrate-spreading, sometimes clambering in brush, 50 cm. to more than 1.5 m. long, the erect or ascending shoots or branches as much as 55 cm. long, glabrous or sparsely pilose, the nodes not villous; sheaths much shorter than the internodes, glabrous or sparsely or rarely densely pilose or papillose-pilose, especially on the margins; ligule thin, erose or lacerate, about 1 mm. long; blades lanceolate, acuminate, 5–12 cm. long, mostly 5–15 mm. wide, rounded and somewhat clasping at the more or less asymmetric base, thin, scaberulous, finely cross-veined; inflorescences terminal and axillary from the upper sheaths, long-exserted or the axillary ones appressed and partly included, usually not dense, the rather slender racemes ascending, the lower ones as much as 7 cm. long; spikelets 3–3.5 mm. long, glabrous or sparsely pilose or hirsute; first glume acuminate, half to two-thirds as long as the spikelet, scabrous on the keel; second glume and sterile lemma acuminate, subequal or the glume a little longer, the lemma enclosing a palea nearly as long as the lemma and sometimes a staminate flower; fruit 2 mm. long, oblong-elliptic, the scars extending downward into very narrow wings.

The spikelets are sometimes proliferous.

Moist forests and shady places, low to medium altitudes, southern Mexico and the West Indies to Argentina.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart* 69, 72, 89; Isla Colón, *von Wedel* 1362; Almirante, *Cooper* 121; Water Valley, *von Wedel* 1577. CHIRIQUÍ: El Boquete, *Hitchcock* 8268, 8273, 8302, 8306, 8318; San Felix, *Pittier* 5204, 5230, 5272; Bajo Chorro, *Woodson & Schery* 687. CANAL ZONE: Fort Randolph, *Standley* 28663; Margarita Swamp, *Maxon & Valentine* 7052; between France Field, Canal Zone, and Catival, Colón, *Standley* 30154, 30175, 30217; Gatún, *Hitchcock* 9181; *Maxon* 4654; Frijoles, *Standley* 27528; Barro Colorado Island, *Standley* 31350, 40805, 41024; Empire to Mandinga, *Piper* 5252; Culebra, *Hitchcock* 8023, 9164, 9210; Summit, *D. H. Popenoe* 2; Las Cascadas Plantation, *Standley* 25674; between Panamá and Corozal, *Hitchcock* 9201; Ancón, *Piper* 5227; Ancón Hill, *Standley* 26397; Balboa, *Standley* 29288. PANAMÁ: Quebrada Salamanca, *Steyermark & Allen* 17143; Cañon of Río Chagres, *Steyermark & Allen* 17505; Alhajueta, *Pittier* 2335; Matías Hernández, *Pittier* 6923; Río Tapia, *Maxon & Harvey* 6690; *Hitchcock* 22951; Taboga Island, *Standley* 27874.

#### 55. LASIACIS (Griseb.) Hitchc.

LASIACIS (Griseb.) Hitchc. Contr. U. S. Nat. Herb. 15:16. 1910.

Spikelets paniculate, subglobose, somewhat inflated, placed obliquely on the pedicels; glumes and sterile lemma papery, usually lanate-pubescent at the tip; first glume one-third to half as long as the spikelet, broad and clasping, the second glume and sterile lemma nearly equal, a little shorter to a little longer than the fertile floret; fruit bony-indurate, blunt, the lemma and palea with a tuft of short hairs from a minute depression at the tip, the margins of the lemma firm but not inrolled; palea convex above, the tip often free at maturity.

Trailing vines or coarse, woody, cane-like, high-clambering perennials with



fascicled branches and open or sometimes contracted panicles terminating the culm and leafy branches, the blades and panicles of the branches usually reduced.

- a. Blades cordate-clasping, usually elongate, as much as 5 cm. wide..... 1. *L. PROCERRIMA*
- aa. Blades not cordate-clasping.
  - b. Plants without a strong central cane, creeping or low-clambering, rooting at the nodes.
    - c. Ligule 0.5–1 mm. long, pale, truncate. Panicles loosely flowered, the spikelets in pairs at the ends of the branches and branchlets... 2. *L. MAXONI*
    - cc. Ligule 3–8 mm. long, dark brown, usually lacerate.
      - d. Panicles 5–6 cm. long, scarcely exerted from the sheath, the branches and branchlets finally stiffly spreading or reflexed..... 3. *L. SCABRIOR*
      - dd. Panicles more than 10 cm. long, the branches usually ascending.
        - e. Spikelets 5 mm. long. Culms smooth, shining, with a pubescent line down one side..... 4. *L. LUCIDA*
        - ee. Spikelets 4 mm. long.
          - f. Ligule 5–8 mm. long; panicle branches few, distant, stiffly spreading or reflexed, the spikelets in clusters at the ends of the branchlets. Blades elliptic-lanceolate, mostly 2–2.5 cm. wide..... 5. *L. LONGILIGULA*
          - ff. Ligule 2–5 mm. long; panicle branches slender, ascending, or if spreading, the spikelets not in clusters at the ends of the branchlets.
            - g. Culms glabrous; blades linear or linear-lanceolate, sometimes elongate, scabrous; panicles partly included in the sheath or only slightly exerted, the branches finally somewhat spreading..... 6. *L. OAXACENSIS*
            - gg. Culms sparsely to densely strigose; blades narrowly elliptic-lanceolate, acuminate, softly pubescent on the lower surface; panicles exerted, the branches narrowly ascending or appressed..... 7. *L. STANDLEYI*
    - bb. Plants with a strong central cane freely branching, erect or clambering over brush to a height of several meters.
      - c. Branches strongly zigzag; blades glabrous, narrowly lanceolate, mostly less than 1 cm. wide; panicles 5–10 cm. long, few-flowered 8. *L. DIVARICATA*
      - cc. Branches straight or arcuate; blades usually softly pubescent on the lower surface, at least those on the main branches more than 1.5 cm. wide; primary panicles large, more than 10 cm. long.
        - d. Blades narrowly lanceolate; panicles open, loosely flowered; spikelets 4–5 mm. long..... 9. *L. SORGHOIDEA*
        - dd. Blades ovate-lanceolate or elliptic, often cordate-clasping at the base, asymmetric; panicles, or at least the branches, compactly flowered; spikelets 3–4 mm. long..... 10. *L. RUSCIFOLIA*

1. *LASIACIS PROCERRIMA* (Hack.) Hitchc. Proc. Biol. Soc. Washington 24:145. 1911.

*Panicum procerrimum* Hack. Oesterr. Bot. Zeitschr. 51:431. 1901.

Culms coarse, semi-woody, 1–4 m. high, erect, single or usually several together in a loose clump, from a woody branching base, the upper internodes very short; sheaths glabrous, sometimes ciliate on the margins, the lower shorter than the internodes, the upper ones closely overlapping; ligule membranaceous, about 1 mm. long; blades 15–40 cm. long, 2–5 cm. wide, often distichous, acuminate, cordate-clasping, glabrous, the margins scabrous; panicles as much as 1 m. long, the lower branches whorled, naked below, ascending or finally spreading, diffuse, as much as 40 cm. long; spikelets 3 mm. long, the lateral ones short-pedicellate.

Wet or moist forests and thickets or brushy slopes, Mexico to Peru.

BOCAS DEL TORO: Laguna de Chiriquí, *von Wedel 1186*. CHIRIQUÍ: El Boquete, *Hitch-*



cock 8283. COLÓN: Fort Lorenzo, *Piper* 5948. CANAL ZONE: Gatún, *Hitchcock* 7984; between Frijoles and Bohio, *Hitchcock* 8393; Empire to Mandinga, *Piper* 5280; Summit, *Standley* 30100; between Pedro Miguel and Corozal, *Hitchcock* 7961; between Corozal and Ancón, *Pittier* 6774; Ancón, *Killip* 4024; Ancón Hill, *Killip* 12066; Balboa, *Standley* 26055; *Rowley & Stark* 945. PANAMÁ: Cerro Campana, *Bartlett* 16902; Arraiján, *Woodson, Allen & Seibert* 1399; Arenoso, lower Río Trinidad, *Seibert* 628; Taboga Island, *Hitchcock* 8087; *Standley* 27055; *Woodson, Allen & Seibert* 1453.

2. *LASIACIS maxoni* Swallen, sp. nov.

Culmi 1–2 m. longi, erecti vel vagantes, ramosi, glabri; vaginae inferiores internodiis breviores, superiores longiores, glabrae, in collo villosae; ligula 0.5–1 mm. longa, truncata, pallida; laminae 17–25 cm. longae, 11–26 mm. latae, acuminatae, glabrae vel scabrae; paniculae 20–35 cm. longae, ramis rigidis adscendentibus vel patentibus, ramulis divergentibus implicatis; spiculae 4 mm. longae, pallidae vel purpurascens.

Culms coarse, woody, erect or straggling, without a central cane, 1–2 m. long, freely branching, glabrous; lower sheaths shorter, the upper much longer than the internodes, glabrous or with a villous line on the collar; ligule 0.5–1 mm. long, truncate, pale; blades 17–25 cm. long, 11–26 mm. wide, acuminate, gradually narrowed from near the base, glabrous or scabrous on both surfaces, the margins scabrous; panicles 20–35 cm. long, nearly as broad, loosely flowered, the slender to rather stout branches stiffly ascending or sometimes spreading, with a prominent pulvinus in the axils, branching at or near the base, the secondary branches and branchlets all divergent, implicate; spikelets 4 mm. long, in pairs at the ends of the branches and branchlets, pale or often purple.

Thickets and forest margins, Costa Rica and Panama.

CHIRIQUÍ: El Boquete, in thickets along wet trail, 1000–1300 m. alt., March 2–8, 1911, *Maxon* 4999 (U. S. Nat. Herb., TYPE); *Hitchcock* 8281; between Hato and Cerro Vaca, *Pittier* 5422.

3. *LASIACIS SCABRIOR* Hitchc. Proc. Biol. Soc. Washington 40:85. 1927.

Culms clambering or straggling, as much as 3 m. long, much branched, the fruiting branches divaricately branched from all the nodes, papillose or papillose-pilose; sheaths papillose-hispid, densely villous on the margin, those of the fruiting branchlets much overlapping; ligule 3–5 mm. long, conspicuous, brown; blades 8–12 cm. long, 1–1.5 cm. wide, elliptic-lanceolate, acuminate, scabrous on the upper surface, pubescent on the lower, the pubescence sometimes sparse; panicles 5–6 cm. long, almost as broad, scarcely exerted from the sheath, rather dense, but finally most of the branches and branchlets divaricately spreading, or sometimes the lower ones reflexed, the axis and branches densely and minutely pubescent; spikelets 4 mm. long.

Moist or wet forests and thickets, Guatemala to Ecuador.

BOCAS DEL TORO: Changuinola Valley, *Dunlap* 406. COCLÉ: La Mesa, *Allen* 2376; El Valle de Antón, *Allen* 1641, 2061.

4. *LASIACIS lucida* Swallen, sp. nov.

Culmi vagantes, ramis adscendentibus 70 cm. altis, unifariam pubescentes,



pallidi vel purpurascens, lucidi; vaginae internodiis breviores, glabrae vel  $\pm$  papillosae vel papilloso-pilosae, marginibus villosis; ligula 6–7 mm. longa, fusca, lacerata; laminae 7–14 cm. longae, 6–12 mm. latae, acuminatae, glabrae, marginibus scabris; paniculae 10–25 cm. longae, ramis gracilibus adscendentibus, basi nudis, ramulis paucifloris appressis; spiculae 5 mm. longae, pedicellis scabris.

Culms straggling, without a strong central cane, the ascending branches about 70 cm. high, glabrous with a pubescent line down one side, pale or tinged with purple, shining; sheaths glabrous or more or less papillose or papillose-pilose, the margins villous, all much shorter than the internodes except the few uppermost ones on the flowering branches; ligule 6–7 mm. long, brown, lacerate; blades 7–14 cm. long, 6–12 mm. wide, acuminate, glabrous, the margins scabrous; panicles 10–25 cm. long, the slender branches ascending, glabrous or sparsely hairy in the axils, pubescent at the base, naked for 2–3 cm. at the base, the branchlets few-flowered, appressed; spikelets 5 mm. long, the pedicels scabrous.

Moist forests, Costa Rica and Panama.

CHIRIQUÍ: Volcán de Chiriquí, above Sabana de El Salto, on trail to Camp Aguacatal, alt. 1500–1750 m., March 10–13, 1911, *Maxon 5266* (U. S. Nat. Herb., TYPE).

5. *LASIACIS longiligula* Swallen, sp. nov.

Culmi suberecti vel vagantes, 1–2 m. longi; vaginae glabrae vel papilloso-hispidae, marginibus dense ciliatis; ligula fusca, 5–8 mm. longa; laminae elliptico-lanceolatae, 10–17 cm. longae, 1–2 cm. latae, supra scabrae, infra minute pubescentes; paniculae 10–25 cm. longae, pauciramosae, ramis adscendentibus in parte inferiore nudis; spiculae 4 mm. longae, subglobosae, ad apices ramulorum glomeratae.

Culms suberect or straggling, mostly 1–2 m. long; sheaths glabrous to papillose-hispid, densely ciliate on the margins; ligule prominent, 5–8 mm. long; blades elliptic-lanceolate, 10–17 cm. long, 1–2.5 cm., or rarely 3 cm. wide, scabrous on the upper surface, minutely pubescent beneath, the margins scabrous; panicles 10–25 cm. long, the few solitary branches stiffly ascending, naked in the lower third or half, the spikelets clustered toward the ends of the branches and branchlets; spikelets 4 mm. long, subglobose, pale.

Moist forests, Costa Rica and Panama.

PANAMÁ: Río Indio, trail towards Chico, Jan. 12, 1935, *Steyermark & Allen 17435* (U. S. Nat. Herb., TYPE).

6. *LASIACIS OAXACENSIS* (Steud.) Hitchc. Proc. Biol. Soc. Washington 24:145. 1911.

*Panicum oaxacense* Steud. Syn. Pl. Glum. 1:73. 1854.

Culms relatively slender, as much as 3 m. long, erect or usually reclining, rooting at the nodes, with no strong central cane, the ascending branches often 1–2 m. long, glabrous; sheaths glabrous on the back, densely villous on the margins; ligule conspicuous, 2–5 mm. long, brown; blades narrowly lanceolate, acuminate, 14–22 cm. long, 7–20 mm. wide, glabrous, the margins scabrous;



panicles 10–25 cm. long, the branches ascending to spreading, glabrous in the axils, usually naked in the lower half, the branchlets narrowly ascending, not implicate, bearing a few spikelets at the ends; spikelets 4 mm. long, roughly globose, usually appressed.

Moist forests and thickets, banks of streams, and moist open ground, Mexico and the West Indies to Peru.

BOCAS DEL TORO: Old Bank Island, *von Wedel 2086*; Changuinola Valley, *Dunlap 166a, 394*; Almirante, *Cooper 105*. CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock 8201*; El Volcán, *White 218*; Monte Lirio, *Seibert 278*. CANAL ZONE: between France Field, Canal Zone, and Catival, Colón, *Standley 30230*; Gatún, *Maxon 4653*; *Hitchcock 9174*; Frijoles, *Killip 4284*; *Standley 27410*; Darién, *Standley 31609*; *Killip 4306*; Gamboa, *Standley 28535*; Empire to Mandinga, *Piper 5278*; Cerro Gordo, near Culebra, *Standley 26009*. PANAMÁ: Juan Díaz, *Killip 4222, 4263*; *Standley 30591*.

7. *LASIACIS STANDLEYI* Hitchc. Proc. Biol. Soc. Washington 40:86. 1927.

Culms straggling, without a strong central cane, rooting at the lower nodes, with rather short internodes, the ascending branches 60–100 cm. long, pilose or papillose-pilose, densely villous just below the panicle; sheaths papillose or usually papillose-pilose, the margins densely ciliate, those of the main culm shorter than the internodes, those of the branches usually about as long as or longer than the internodes; ligule 3–5 mm. long, brown; blades 8–12 cm. long, 5–12 mm. wide, lanceolate or lanceolate-elliptic, acuminate, glabrous or minutely pubescent above, densely and softly pubescent to nearly glabrous beneath; panicles 13–19 cm. long, the solitary distant branches narrowly ascending or somewhat spreading, pubescent at the base, villous in the axils, the branchlets appressed; spikelets 4 mm. long, appressed, the pedicels usually sparsely pilose.

Open forests and jungle margins, Costa Rica and Panama.

CHIRIQUÍ: El Boquete, *Hitchcock 8267*; *Killip 4529*; New Switzerland, *Allen 1338*.

8. *LASIACIS DIVARICATA* (L.) Hitchc. Contr. U. S. Nat. Herb. 15:16. 1910.

*Panicum divaricatum* L. Syst. Nat. ed. 10. 2:871. 1759.

*Panicum bambusioides* Desv. ex Hamilt. Prodr. Pl. Ind. Occ. 10. 1825.

*Panicum chauvinii* Steud. Syn. Pl. Glum. 1:68. 1854.

*Panicum divaricatum*  $\beta$ . *stenostachyum* Griseb. Fl. Brit. W. Ind. 551. 1864.

Culms clambering, with a strong central cane, as much as 4 m. long, freely branching, glabrous or sometimes sparsely pilose, the branches often fascicled, the secondary shoots strongly divaricate or zigzag; sheaths glabrous on the back, the margins densely villous; blades narrowly lanceolate, 5–15 cm. long, 5–15 mm. wide, glabrous, the margins scabrous; panicles commonly 5–8 cm. long, or the primary as much as 20 cm. long, the few-flowered scabrous and sparsely pilose branches 1–5 cm. long, spreading or reflexed, the panicles of the ultimate branchlets much reduced; spikelet 4 mm. long.

Thickets and forest borders, southern Florida, Mexico and the West Indies to Bolivia and northern Argentina.

PANAMÁ: Alhajuella, *Pittier 2342*.



9. *Lasiacis sorghoidea* (Desv.) Hitchc. & Chase, Contr. U. S. Nat. Herb. 18:338. 1917.

*Panicum lanatum* Swartz, Prodr. Veg. Ind. Occ. 24. 1788. Not *P. lanatum* Rottb., 1776.

*Panicum sorghoideum* Desv. ex Hamilt. Prodr. Pl. Ind. Occ. 10. 1825.

*Panicum divaricatum* var. *lanatum* Schlecht. & Chamisso, Linnaea 6:33. 1831.

*Panicum praegnans* Steud. Syn. Pl. Glum. 1:74. 1854.

*Panicum lanatum*  $\beta$ . *sorghoideum* Griseb. Fl. Brit. W. Ind. 551. 1864.

*Panicum martinicense* Griseb. Fl. Brit. W. Ind. 552. 1864.

*Panicum swartzianum* Hitchc. Contr. U. S. Nat. Herb. 12:140. 1908.

*Lasiacis swartziana* Hitchc. Bot. Gaz. 51:302. 1911.

Robust with a strong central cane; culms erect or clambering, 2–7 m. high, freely branching, the main branches as much as 1 m. long, arcuate, drooping, or the branchlets fascicled on the main culm; sheaths papillose-hirsute to glabrate with a densely villous line on the collar, those of the main culm and branches shorter than the internodes, those of the branchlets longer than the internodes, often somewhat crowded; ligule inconspicuous; blades lanceolate, symmetrical, velvety on both surfaces or nearly glabrous above, those of the main culm as much as 20 cm. long and 3 cm. wide, those of the branches mostly 8–15 cm. long, 1–3 cm. wide, and those of the ultimate branches frequently much smaller; panicles of the main branches 10–20 cm. long, open and comparatively loosely many-flowered, the panicles of the fascicled and ultimate branches usually much reduced; spikelets 4–5 mm. long.

Sometimes called Carricillo in the Canal Zone.

Thickets, ravines, and forest borders, Mexico and the West Indies to Bolivia and Argentina.

CHIRIQUÍ: El Boquete, *Hitchcock* 8269, 8270, 8282, 8286, 8311, 8315; *Killip* 4544; *Davidson* 710; Cerro Vaca, *Pittier* 5331, 5339. CANAL ZONE: Toro Point, *Hitchcock* 8054; Chagres, *Fendler* 371; between France Field, Canal Zone, and Catival, Panamá, *Standley* 30153; Gatún, *Hitchcock* 9175, 9177, 9182; Barro Colorado Island, *Standley* 40837; Gamboa, *Standley* 28320; Ancón Hill, *Killip* 4028; *Piper* 5281; *Williams* 4; Las Cascadas Plantation, *Standley* 25775, 29523; Summit, *Allen* 2281; Pedro Miguel, *Hitchcock* 7955; Red Tank to Pueblo Nuevo, *Piper* 5219; between Miraflores and Corozal, *Pittier* 2196; Corozal, *Killip* 4186; Culebra, *Pittier* 2118; *Standley* 25955, 25987, 26001; Balboa, *Hitchcock* 8003; *Standley* 25452, 26065, 29319; *Greenman* & *Greenman* 5052.

10. *Lasiacis ruscifolia* (H.B.K.) Hitchc. Proc. Biol. Soc. Washington 24:145. 1911.

*Panicum ruscifolium* H.B.K. Nov. Gen. & Sp. 1:101. 1815.

*Panicum compactum* Swartz, Adnot. Bot. 14. 1829. Not *P. compactum* Kit., 1814.

*Panicum liebmannianum* Fourn. Mex. Pl. 2:33. 1886.

*Lasiacis compacta* Hitchc. Bot. Gaz. 51:302. 1911.

*Lasiacis liebmanniana* Hitchc. Proc. Biol. Soc. Washington 24:145. 1911.

Very robust with a strong central cane, clambering culms several meters high, usually glabrous, freely branching; sheaths usually shorter, sometimes a little longer than the internodes, glabrous or rarely hispid, the margins glabrous or sometimes villous; ligule inconspicuous; blades usually asymmetrical, ovate-lanceolate to lanceolate, acuminate, the primary ones 10–15 cm. long, 3–6 cm. wide, those of



the branches, especially the secondary branches, often much smaller, softly pubescent to glabrous on the lower surface, the upper surface glabrous or scabrous; panicles 5–20 cm. long, narrow, compact, or the lower branches somewhat distant and spreading, but densely flowered, the whole panicle sometimes open with implicate loosely flowered branches; spikelets 3–4 mm. long, green, nearly globose, at least at maturity.

Commonly called Carrizo.

Forests, thickets, and brushy slopes, West Indies; Mexico to Peru and Argentina.

BOCAS DEL TORO: Water Valley, *von Wedel 1856*. COCLÉ: Aguadulce, *Pittier 4987, 4998*; Río Mata Ahogado, *Allen 142*. VERAGUAS: headwaters of Río Cañazas, *Allen 176*. HERRERA: Pese, *Allen 797*. CANAL ZONE: Gatuncillo, *Piper 5257*; Río Abajo, *Bartlett 16397*; Pedro Miguel, *Killip 4311*; between Panamá and Corozal, *Hitchcock 9204*; Balboa, *Hitchcock 8060*; *Standley 25258, 25438, 26077, 29318, 32134*. PANAMÁ: Matías Hernández, *Pittier 6892*; Chepo, *Pittier 4688*; Panamá, *Hitchcock 8401*; *Standley 26890*; Bella Vista, *Killip 4040, 12011*; *Standley 25302*; Punta Paitilla, *Standley 30807, 30809*; Tropicho Island, *Allen 2624*; Taboga Island, *Hitchcock 8068*; *Killip 4157*; *Standley 27017, 27870*; *Pittier 3603*; *Allen 137, 1290*; *McBride 2788*.

#### 56. SACCIOLEPIS Nash

SACCIOLEPIS Nash in Britton, Man. 89. 1901.

Spikelets oblong-conic; first glume acute, 3- to 5-nerved, small to half as long as the spikelet; second glume broad, inflated-saccate, strongly many-nerved; sterile lemma narrower, flat, usually 5-nerved, the palea well developed and often enclosing a staminate flower; fruit much smaller than the spikelet, very short-stipitate, chartaceous-indurate, the margins inrolled, the palea free at the summit.

Erect or decumbent spreading annuals or perennials of wet soil, with linear blades and usually dense elongate spike-like panicles.

- a. Spikelets 2 mm. long, sparsely pilose; plants annual, usually erect, not decumbent-spreading or rooting at the nodes..... 1. *S. MYUROS*  
 aa. Spikelets 4 mm. long, glabrous; plants perennial, usually decumbent-spreading, rooting at the nodes..... 2. *S. STRIATA*

1. SACCIOLEPIS MYUROS (Lam.) Chase, Proc. Biol. Soc. Washington 21:7. 1908.

*Panicum myuros* Lam. Tabl. Encycl. 1:172. 1791.

*Panicum myosurus* L. Rich. Act. Soc. Hist. Nat. Paris 1:106. 1792.

*Hymenachne myuros* Beauv. Ess. Agrost. 49, 165. 1812.

*Panicum pbleiforme* Presl, Rel. Haenk. 1:302. 1830.

Slender annual; culms usually erect, 10 cm. to as much as 1 m. high; sheaths glabrous, longer than the internodes; blades mostly 10–25 cm. long, 3–5 mm. wide, or smaller in depauperate specimens, glabrous or rarely sparsely hairy; panicles spike-like, 5–25 cm. long (commonly 10–15 cm.), about 5 mm. thick; spikelets 2 mm. long, sparsely pilose.

Wet savannas, marshes, fields, and along streams, at low altitudes, Mexico and Cuba, to Bolivia and Brazil.

COCLÉ: Aguadulce, *Pittier 4916, 4920*. CANAL ZONE: Corozal, *Killip 4243*. PANAMÁ: Matías Hernández, *Standley 28905, 31983*; Nuevo San Francisco, *Standley 30747*;



Panamá, Standley 27802; mouth of Pacora River, Killip 4210; Río Tecúmen, Standley 26624; between Río Chilibre and Alhajuela, Pittier 2327.

2. *SACCIOLEPIS STRIATA* (L.) Nash, Bull. Torrey Club 30:383. 1903.

*Holcus striatus* L. Sp. Pl. 1048. 1753.

*Panicum striatum* Lam. Tabl. Encycl. 1:172. 1791.

*Sorghum striatum* Beauv. Ess. Agrost. 132, 165. 1812.

*Panicum gibbum* Ell. Bot. S. C. & Ga. 1:116. 1816.

*Panicum aquaticum* Muhl. Descr. Gram. 126. 1817. Not *P. aquaticum* Poir., 1816.

*Panicum hydrophilum* Schult. Mant. 2:237. 1824.

*Panicum ellottianum* Schult. Mant. 2:256. 1824.

*Panicum aquaticum* Bosc ex Spreng. Syst. Veg. 1:319. 1825. Not *P. aquaticum* Poir., 1816.

*Hymenachne striata* Griseb. Fl. Brit. W. Ind. 554. 1864.

*Sacciolepis gibba* Nash in Britton, Man. 89. 1901.

*Sacciolepis striata* forma *gibba* Fernald, Rhodora 44:381. 1942.

Perennial; culms commonly 1–2 m. long, usually decumbent-spreading, rooting at the lower nodes, glabrous; sheaths, except the uppermost, shorter than the internodes, glabrous or more or less papillose-hirsute, the margins ciliate; ligule very short, minutely ciliate; blades 4–20 cm. long, 2–5 mm., rarely 15 mm., wide, glabrous or sparsely pilose, the margins scabrous; panicles 6–20 cm. long, narrow and rather dense, interrupted, especially toward the base, the branches appressed; spikelets 4 mm. long, glabrous; fruit about 1.6 mm. long.

Marshes, ditches, and wet places, sometimes floating in water, southeastern United States, West Indies, and Panama.

CANAL ZONE: Barro Colorado Island, Bailey & Bailey 387.

57. *HYMENACHNE* Beauv.

*HYMENACHNE* Beauv. Ess. Agrost. 48. *pl. 10. f. 8.* 1812.

Spikelets acuminate, short-pedicellate in dense spike-like or interrupted panicles; first glume acute or acuminate, 3- to 5-nerved, one-third to half as long as the spikelet, remote, a distinct stipe below the second glume; second glume and sterile lemma exceeding the fruit, 5-nerved, acuminate, the lemma longer than the glume, the tip awn-like; fruit membranaceous, pale, the margins of the lemma not inrolled, the tip of the palea not enclosed.

Coarse aquatic perennials with long, broad, cordate clasping blades and long, spike-like or open panicles with spreading densely flowered branches.

- |   |                            |
|---|----------------------------|
| a. Panicles spike-like, dense; spikelets 3–4 mm. long, the second glume and sterile lemma rather prominently scabrous on the nerves.....  | 1. <i>H. AMPLEXICAULIS</i> |
| aa. Panicles not spike-like, the branches ascending to spreading, the lower ones 5–10 cm. long; spikelets 2–2.5 mm. long, the second glume and sterile lemma scabrous only on the midnerve..... | 2. <i>H. DONACIFOLIA</i>   |

1. *HYMENACHNE AMPLEXICAULIS* (Rudge) Nees, Agrost. Bras. 276. 1829.

*Panicum hymenachne* Desv. Opusc. 82. 1831.

*Agrostis monostachya* Poir. in Lam. Encycl. Suppl. 1:256. 1810.

*Panicum amplexicaule* Rudge, Pl. Guian. 1:21. *pl. 27.* 1805.

Coarse aquatic perennial; culms succulent, slender or usually rather thick, sparingly branching, glabrous, the base creeping, rooting at the nodes, 1–2 m. long,



or even longer; sheaths usually shorter than the internodes, glabrous or sometimes ciliate on the margins; blades commonly 15–35 cm. long, 1.5–3 cm. wide, or smaller on some of the branches, acuminate, gradually narrowed from the cordate-clasping base, the margins scabrous, more or less papillose-hispid-ciliate at the base; panicles 20–50 cm. long, sometimes shorter, 8–15 mm. thick, dense, spike-like, the lower branches often distant; spikelets 3–4 mm. long, acuminate, the second glume and sterile lemma rather prominently scabrous on the nerves, the lemma often awn-pointed.

Swamps, ditches, and margins of rivers, lakes, and streams, sometimes in water 3–4 feet deep. Tropics of both hemispheres; southern Mexico and the West Indies to Argentina.

COCLÉ: Aguadulce, *Pittier 4908*. CANAL ZONE: Gatún, *Hitchcock 8030*; Juan Mina, *Killip 4167*; Barro Colorado Island, *Standley 21465*; *D. H. Poopenoe 45*. DARIÉN: Sambú River, *Pittier 5530*.

2. *HYMENACHNE DONACIFOLIA* (Raddi) Chase, Jour. Washington Acad. Sci. 13:177. 1923.

*Panicum donacifolium* Raddi, Agrost. Bras. 44. 1823.

*Panicum auriculatum* Willd. in Spreng. Syst. Veg. 1:322. 1825.

*Hymenachne auriculata* Chase, Proc. Biol. Soc. Washington 21:5. 1908.

Similar in habit, appearance, and vegetative characters to *H. amplexicaulis*; blades usually widened above the base, more or less asymmetric, as much as 5.5 cm. wide; panicles mostly 25–35 cm. long, attenuate, dense, the branches rather slender but densely flowered, narrowly ascending to somewhat spreading, the lower ones 5–10 cm. long, floriferous to the base; spikelets 2–2.5 mm. long, acute, the second glume and sterile lemma scabrous on the midnerve, but not prominently as in *H. amplexicaulis*.

Swamps, ditches, and river banks and margins, often in water a few feet deep, Cuba; Costa Rica; Panama. Trinidad to Bolivia and Argentina.

CANAL ZONE: Gatún swamp, *Hitchcock 9170*; Juan Mina, *Bartlett & Lasser 16880*. PANAMÁ: Río Tecúmen, *Standley 26494*.

58. *HOMOLEPIS* Chase

*HOMOLEPIS* Chase, Proc. Biol. Soc. Washington 24:146. f. 12. 1911.

Spikelets lanceolate-acuminate, rather large, in open panicles; glumes similar, equal, or the first a little shorter, 7- to 9-nerved, completely covering the sterile lemma and fertile floret; sterile lemma thinner than the glumes, 7-nerved, villous between the lateral nerves, the back flat, the margins clasping the fertile floret; fruit acuminate, indurate, smooth and shining, the margins of the lemma broad, flat, or inrolled toward the tip.

Stoloniferous perennials with short flat blades and small narrow open panicles of large spikelets.



1. HOMOLEPIS ATURENSIS (H.B.K.) Chase, Proc. Biol. Soc. Washington 24:146. f. 12. 1921.

*Panicum aturense* H.B.K. Nov. Gen. & Sp. 1:103. pl. 33. 1815.

*Panicum blepharophorum* Presl, Rel. Haenk. 1:312. 1830.

*Panicum tumescens* Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 3<sup>2</sup>:316. 1834.

Stoloniferous perennial, the stolons determinate; culms slender, erect or ascending, sometimes geniculate, commonly 15–50 cm. long, or sometimes longer, glabrous; sheaths mostly shorter than the internodes, slightly inflated, glabrous on the back, with a pubescent line on collar, villous-ciliate on the margins; ligule about 0.5 mm. long, truncate, minutely ciliate; blades lanceolate, 5–12 cm. long, 1–1.5 cm. wide, acute, rounded or subcordate at the base, minutely cross-veined, the margins scabrous or sometimes very sparsely-ciliate; stolon blades mostly 3–5 cm. long, 8–10 mm. wide; panicles 5–10 cm. long, narrow, the slender few-flowered branches narrowly ascending or appressed; spikelets about 7 mm. long, acuminate, glabrous.

Moist forests, margins of swamps and ditches, and moist open ground, sometimes a weed in cultivated places, Mexico to Bolivia and Brazil.

BOCAS DEL TORO: Isla Colón, von Wedel 2801; Old Bank Island, von Wedel 2064. CHIRIQUÍ: El Boquete, Hitchcock 8352. CANAL ZONE: Toro Point, Hitchcock 8051; Chagres, Fendler 370; Fort Sherman, Standley 30997; Maxon & Valentine 7031; between Mindi and Colón, Hitchcock 7940; Darién, Standley 31558; between Gorgona and Tabernilla, Hitchcock 7963; Juan Mina, Piper 5268; Empire, Pittier 3727; Culebra, Hitchcock 7893; Summit, Standley 30071; Muenscher 12211; between Corozal and Ancón, Pittier 2635; Ancón Hill, Killip 4196. PANAMÁ: Orange River, Cornman 2572; Chorrera, Hitchcock 8129; Río Tecúmen, Standley 26513; Arraiján, Woodson, Allen & Seibert 1379. DARIÉN: Río Yapé, Allen 332.

#### 59. ISACHNE R. Br.

ISACHNE R. Br. Prodr. Fl. Nov. Holl. 196. 1810.

Spikelets subglobose with two well-developed florets, the lower perfect or staminate, indurate and similar to the upper, or herbaceous and similar to the glumes, the rachilla segment between the florets evident; glumes equal, similar, shorter than the spikelet, exposing the florets; fruit plano-convex, indurate, the narrow margins of the lemma inrolled.

Herbaceous or sometimes woody perennials with flat blades and open or condensed panicles.

- a. Low annual; culms slender, creeping; first floret similar to the glume in texture; fruit densely pubescent..... 1. I. POLYGONOIDES  
 aa. Coarse perennial; culms cane-like, woody, erect or clambering; first floret similar to the second, both glabrous..... 2. I. ARUNDINACEA

1. ISACHNE POLYGONOIDES (Lam.) Doell in Mart. Fl. Bras. 2<sup>2</sup>:273. 1877.

*Panicum polygonoides* Lam. Encycl. 4:742. 1798.

*Panicum trachyspermum* Nees, Agrost. Bras. 212. 1829.

*Isachne trachyspermum* Nees in Seem. Bot. Voy. Herald 224. 1854.

Decumbent-spreading annual; culms slender, glabrous, ascending, rooting at the nodes, sometimes geniculate, freely branching, the erect shoots finally bearing



fascicled branchlets; sheaths much shorter than the internodes, papillose-hirsute to nearly glabrous, the margins usually ciliate; ligule ciliate; blades ovate-lanceolate, 1–5 cm. long, 5–15 mm. wide, very scabrous, papillose-hispid-ciliate at the rounded base; panicles 5–10 cm. long, nearly as wide, partly enclosed in the sheath, the branches and branchlets stiffly spreading or even reflexed, implicate, glandular-spotted; spikelets 1.5–1.7 mm. long, glabrous; first floret as long as the second glume, similar in texture, not indurate, glabrous; fruit about 1.2 mm. long, strongly plano-convex, densely pubescent.

Wet forests and savannas, grassy swamps, and along ditches and streams, Costa Rica and the West Indies to Peru and Brazil.

CHIRIQUÍ: Dolega, *Hitchcock* 8333; David, *Hitchcock* 8375; El Boquete, *Killip* 4571. COCLÉ: Aguadulce, *Pittier* 4917. COLÓN: Porto Bello, *Pittier* 2454. VERAGUAS: Soná, *Allen* 1068. CANAL ZONE: Gatún, *Hitchcock* 9171; Barro Colorado Island, *Kenoyer* 120; *Bailey & Bailey* 645; Juan Mina, *Bartlett & Lasser* 16500; Las Cruces Trail, *Killip* 4189; between Panamá and Corozal, *Hitchcock* 9198; between Fort Clayton and Corozal, *Standley* 29133. PANAMÁ: Las Sabanas, *Standley* 25943; Río Pescado, *Bartlett & Lasser* 16599; Matías Hernández, *Standley* 28991; Juan Díaz, *Killip* 4060, 4170; Río Tapia, *Standley* 28224; Río Tecúmen, *Standley* 26569; Nuevo San Francisco, *Standley* 30754; Chepo, *Pittier* 4531; *Hunter & Allen* 15; between Pacora and Chepo, *Woodson, Allen & Seibert* 1655.

## 2. ISACHNE ARUNDINACEA (Swartz) Griseb. Fl. Brit. W. Ind. 553. 1864.

*Panicum arundinaceum* Swartz, Prodr. Veg. Ind. Occ. 24. 1788.

Coarse woody perennial; culms cane-like, clambering, 1–6 m. long, freely branching, the branches drooping, elongate; sheaths of the main culm much shorter than the internodes, those of the branches overlapping, glabrous to papillose-hispid, especially on the margins; ligule ciliate, 2–3 mm. long; blades firm, 10–20 cm. long, 1–2 cm. wide, acuminate, scabrous, especially on the margins, and sometimes shortly hispid; panicles 6–12 cm. long, the branches stiffly ascending or finally spreading, naked toward the base; spikelets 1.5–1.7 mm. long, clustered at the ends of the branches; glumes equal, similar, shorter than the fruit, glabrous or sparsely hispid; fertile florets similar in texture, glabrous on the back, sparsely pilose at the base, the first elliptic, acutish, the second smaller, oblong.

CHIRIQUÍ: El Boquete, *Hitchcock* 8277. COCLÉ: El Valle, *Allen* 119.

## 60. OPLISMENUS Beauv.

OPLISMENUS Beauv. Fl. Owar. 2:14. pl. 68. f. 1. 1810.

Spikelets subsessile, solitary or in pairs, crowded, in two rows on one side of a slender rachis; glumes nearly equal, more than half as long as the sterile lemma, 3- to 5-nerved, the first long-awned, the second short-awned; sterile lemma longer than the fruit, mucronate or short-awned, enclosing a hyaline palea; fruit elliptic, acute, indurate, smooth and shining, the margins firm, enclosing the palea.

Creeping, branching annuals or perennials with thin lanceolate or lanceolate-acuminate blades and inflorescences composed of few to several short, stiffly ascending or spreading racemes approximate or rather distant on a main axis.



- a. Plants annual; rachis of racemes densely hairy; awns antrorsely scabrous..... 1. O. BURMANNI  
 aa. Plants perennial; rachis of racemes scabrous; awns smooth..... 2. O. HIRTELLUS

1. OPLISMENUS BURMANNI (Retz.) Beauv. Ess. Agrost. 54. 1812.

*Panicum burmanni* Retz. Obs. Bot. 3:10. 1783.

*Orthopogon burmanni* Trin. Fund. Agrost. 181. 1820.

*Oplismenus affinis* Schult. Mant. 2:273. 1824.

*Oplismenus affinis* Presl, Rel. Haenk. 1:323. 1830.

*Oplismenus cristatus* Presl, Rel. Haenk. 1:323. 1830.

*Oplismenus preslii* Kunth, Rév. Gram. 1: Suppl. X. 1830.

*Panicum schultesii* Steud. Nom. Bot. ed. 2. 2:263. 1841.

*Oplismenus humboldtianus* var. *muticus* Fourn. Mex. Pl. 2:37. 1886.

*Oplismenus humboldtianus* var. *nudicaulis* Vasey, Contr. U. S. Nat. Herb. 1:363. 1893.

Low creeping annual; culms slender, 15–50 cm. long, nearly simple to freely branching, with short internodes, decumbent or prostrate-spreading with ascending branches; sheaths usually much shorter than the internodes, sparsely to densely papillose-hispid, the margins densely ciliate; blades broadly lanceolate-elliptic, often asymmetrical, acuminate, 1.5–5 cm. long, 5–15 mm. wide, glabrous to pubescent or hirsute, the margins scabrous; inflorescence 1–6 cm. long, frequently long-exserted, of 3–6, rarely 10, short approximate racemes, the axis densely villous, flexuous; racemes 0.5–2 cm. long, ascending, the rachis densely villous; spikelets 3 mm. long, usually densely villous; glumes minutely lobed, about 2 mm. long, the second a little longer than the first; awns antrorsely scabrous, that of the first glume 10–14 mm. long, of the second 3–8 mm. long; sterile lemma minutely lobed, awnless, or with an awn 1–3 mm. long; fruit 2 mm. long, narrowly elliptic, acute.

Called Pajita de ratón in Panama.

Moist forests, thickets, and savannas; a common weed in fields and waste places, Mexico and the West Indies to Brazil; Tropics of both hemispheres.

BOCAS DEL TORO: Bocas del Toro, *Carleton 18*; Laguna de Chiriquí, *Hart 74*; Water Valley, *von Wedel 1494*; Quebrada Nigua, *von Wedel 2739*; Changuinola Valley, *Stark 52*; Almirante, *Cooper 98*. CHIRIQUÍ: El Boquete, *Hitchcock 8304*; San Felix, *Pittier 5205*. CANAL ZONE: Chagres, *Fendler 363*; Gamboa, *Standley 28512*; Valley of Masambí, *Maxon 4688*; Empire, *Hitchcock 7951*; Culebra, *Hitchcock 9165*; *Pittier 2086*; Ancón Hill, *Killip 4244*; Sosa Hill, *Standley 25248*; Balboa, *Standley 25451*; Balboa Heights, *Killip 4180*. PANAMÁ: Matías Hernández, *Pittier 6822*; Panamá, *Killip 4191*; Río Tapia, *Standley 28050*; Río Tecúmen, *Standley 26538*; Chepo, *Hunter & Allen 13*; Taboga Island, *Standley 27080*; *McBride 2806*; *Allen 1301*. WITHOUT LOCALITY: *Haenke* (TYPE).

2. OPLISMENUS HIRTELLUS (L.) Beauv. Ess. Agrost. 54, 168. 1812.

*Panicum birtellum* L. Syst. Nat. ed. 10. 2:870. 1759.

*Orthopogon cubensis* Spreng. Syst. Veg. 1:307. 1825.

*Echinochloa cubensis* Schult. Mant. 3 (Add. 1):596. [1827].

*Oplismenus cubensis* Kunth, Rév. Gram. 1:45. 1829.

*Panicum cubense* Steud. Nom. Bot. ed. 2. 2:255. 1841.

*Oplismenus chondrosioides* Fourn. Mex. Pl. 2:39. 1886.

Widely spreading perennial; culms with short internodes, freely branching, decumbent-spreading and rooting at the nodes, the erect or ascending branches 20–70 cm. long; sheaths glabrous to densely papillose-hispid, the margins ciliate,



the lower ones usually much shorter than the internodes, the upper frequently overlapping; blades 4–10 cm., rarely 15 cm., long, 1–2 cm. wide, acuminate, usually asymmetric, rather thin, glabrous or sometimes pubescent, the margins scabrous; inflorescence 5–15 cm. long, of 3–7 stiffly ascending, rather distant racemes 1–2 cm., rarely 3 cm., long, the rachis more or less papillose-hispid, especially at the base; spikelets 3–3.5 mm. long, glabrous to sparsely pilose; glumes about equal, 2 mm. long; awns glabrous, usually purplish, that of the first glume 5–10 cm. long, that of the second about 2 mm. long; sterile lemma acuminate; fruit 3 mm. long, elliptic, acute, minutely striate.

Moist forests, thickets, and banks of rivers and streams, Mexico and the West Indies to Argentina.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart 83*; Old Bank Island, *von Wedel 2073*. CHIRIQUÍ: Volcán de Chiriquí, *Hitchcock 8194*; El Boquete, *Hitchcock 8309, 8312*. COCLÉ: Río Mata Ahogado, *Allen 129*. CANAL ZONE: Fort Sherman, *Standley 31046*; Gatún, *Hitchcock 9184*; Frijoles, *Standley 27569*; Barro Colorado Island, *Standley 31251*; Darién Station, *Standley 31636*; *Bailey & Bailey 113*; Las Cascadas Plantation, *Standley 25712, 29498*; Culebra, *Standley 26010*; East Paraíso, *Standley 29929*; Ancón Hill, *Killip 4206*; Balboa, *Standley 29263*. PANAMÁ: Campana, *Allen 1319*.

#### 61. ECHINOCHLOA Beauv.

ECHINOCHLOA Beauv. *Ess. Agrost. 53. pl. II. f. 2. 1812.*

Spikelets subsessile, solitary or in pairs in two rows on one side of a slender rachis, scabrous and sparsely to prominently hispid; first glume broad, triangular, acute, 3-nerved; second glume and sterile lemma nearly equal, 5- to 7-nerved, the lateral nerves approximate, mucronate, or the glume short-awned, the lemma long-awned, sometimes enclosing a palea and staminate flower; fruit plano-convex, elliptic, minutely crested, indurate, shining, minutely striate, the margins of the lemma not inrolled, the tip of the palea not enclosed.

Slender to coarse annuals or perennials with compressed sheaths, linear blades, and few to many densely flowered racemes, distant or approximate on a main axis.

- a. Ligule a dense line of long yellowish hairs; plants perennial..... 1. E. SPECTABILIS
- aa. Ligule wanting; plants annual.
  - b. Spikelets 3 mm. long, strongly hispid, the sterile lemma with an awn 1–10 mm. long; culms coarse, erect or decumbent at the base..... 2. E. CRUSPAVONIS
  - bb. Spikelets 2–2.5 mm. long, scabrous, sparsely and inconspicuously hispid, the second glume and sterile lemma mucronate only; culms slender, erect to prostrate-spreading..... 3. E. COLONUM

1. ECHINOCHLOA SPECTABILIS (Nees) Link, *Hort. Berol. 2:209. 1833.*

*Panicum spectabile* Nees in *Trin. Gram. Pan. 138. 1826.*

Coarse aquatic perennial; culms 1–2 m. high from a long creeping rooting base, the nodes usually densely bearded with yellowish hairs; sheaths glabrous to papillose-hispid, the margins papillose-hispid-ciliate; ligule a dense line of stiff yellowish hairs about 4 mm. long; blades elongate, acuminate to attenuate, 1–3 cm. wide, the margins very scabrous, sparsely papillose or ciliate at the base; inflorescence 10–30 cm. long, erect, dense, the axis very scabrous and sparsely hispid;



racemes usually crowded, 3–6 cm. long, ascending to spreading, the rachis hispid, especially at the base; spikelets about 5 mm. long, very short-pedicelled, coarsely hispid; first glume broad, acute, or short-awned, two-thirds to three-fourths as long as the spikelet; second glume acuminate; sterile lemma containing a staminate flower, the awn 2–10 mm. long; fruit 4–5 mm. long including a pointed beak about 0.5 mm. long.

Swamps and ditches near the coast, sometimes in water several feet deep. Mexico and the West Indies to Argentina.

SAN BLAS: near Puerto Obaldía, *Pittier* 4383.

2. *ECHINOCHLOA CRUSPAVONIS* (H.B.K.) Schult. Mant. 2:269. 1824.

*Oplismenus cruspavonis* H.B.K. Nov. Gen. & Sp. 1:108. 1815.

*Panicum sabulicola* Nees, Agrost. Bras. 258. 1829.

*Panicum cruspavonis* Nees, Agrost. Bras. 259. 1829.

*Panicum aristatum* Macfad. Bot. Misc. (Hook.) 2:115. 1831.

*Oplismenus jamaicensis* Kunth, Enum. Pl. 1:147. 1833.

*Panicum jamaicensis* Steud. Nom. Bot. ed. 2. 2:257. 1841.

*Panicum crusgalli* var. *sabulicola* Doell in Mart. Fl. Bras. 2<sup>2</sup>:142. 1877.

*Oplismenus angustifolius* Fourn. Mex. Pl. 2:40. 1886.

*Echinochloa sabulicola* Hitchc. Contr. U. S. Nat. Herb. 17:257. 1913.

*Echinochloa crusgalli cruspavonis* Hitchc. Contr. U. S. Nat. Herb. 22:148. 1920.

*Echinochloa zelayensis* var. *subaristata* Wiegand, Rhodora 23:54. 1921.

Annual; culms soft and somewhat succulent but rather coarse, erect or decumbent at the base, compressed, glabrous, shiny, 0.5–1.5 m. high; lower sheaths longer, the upper shorter than the internodes, compressed, keeled, rather loose, glabrous; ligule wanting; blades elongate, acuminate, 5–15 mm. wide, the margins scabrous; panicles 10–20 cm. long, nodding, the branches densely flowered, the lower ones rather distant, the upper ones crowded, ascending or appressed; spikelets 3 mm. long, rather narrow, sparsely hispid on the nerves, hispidulous between the nerves; first glume broad, triangular, acute; second glume and sterile lemma equal, as long as or a little shorter than the fruit, 5- to 7-nerved, the glume acuminate or short-awned, the lemma with an awn 1–10 mm. long, sometimes with a palea about as long as the lemma; fruit elliptic, smooth and shining, abruptly acuminate-pointed.

Along ditches and in moist or wet ground, tropical and subtropical regions of both hemispheres; southern United States and the West Indies to Bolivia and Argentina.

CANAL ZONE: Chagres, *Fendler* 365; between Miraflores and Pedro Miguel, *Pittier* 2508; Victoria Fill, *Allen* 1707; between Pedro Miguel and Corozal, *Hitchcock* 7958; Corozal, *Standley* 27400; Ancón, *Killip* 4107; *Bro. Celestine* 18; Balboa, *Hitchcock* 7999; *Standley* 30876.

3. *ECHINOCHLOA COLONUM* (L.) Link, Hort. Berol. 2:209. 1833.

*Panicum colonum* L. Syst. Nat. ed. 10. 2:870. 1759.

*Milium colonum* Moench, Meth. Pl. 202. 1794.

*Oplismenus colonum* H.B.K. Nov. Gen. & Sp. 1:108. 1815.

*Panicum zonale* Guss. Fl. Sic. Prodr. 1:62. 1827.

*Oplismenus repens* Presl, Rel. Haenk. 1:321. 1830.

*Panicum prorepens* Steud. Syn. Pl. Glum. 1:46. 1854.



- Oplismenus crusgalli* var. *colonum* Coss. & Dur. Expl. Sci. Alger. 2:28. 1854.  
*Panicum crusgalli* var. *colonum* Coss. ex Richt. Pl. Eur. 1:26. 1890.  
*Panicum colonum* var. *zonale* L. H. Dewey, Contr. U. S. Nat. Herb. 2:502. 1894.  
*Echinochloa colonum* var. *zonalis* Woot. & Standl. N. Mex. Coll. Agr. Bull. 81:45. 1912.

Annual; culms slender, prostrate to erect, freely branching at the base and lower nodes, 15–70 cm. long; sheaths glabrous; ligule wanting; blades soft and rather thin, lax, 5–10 cm., rarely 15 cm., long, 3–6 mm., rarely 10 mm., wide, glabrous, the margins sparsely scabrous; inflorescence 3–10 cm. long, rarely longer; racemes few to several, ascending, the lower ones 1–2 cm. distant, 1–3 cm. long; spikelets 2–2.5 mm. long, scabrous or finely hispid; first glume triangular, acute, about one-third as long as the spikelet; second glume and sterile lemma equal, pointed, awnless; fruit 1.8 mm. long, elliptic, acute.

CANAL ZONE: Frijoles, *Standley* 27648, 31475; New Frijoles, *Pittier* 6837; between Frijoles and Monte Lirio, *Killip* 12176; Darién Station, *Standley* 31537; Gamboa, *Standley* 28528; Las Cascadas Plantation, *Standley* 29552; Empire, *Pittier* 3720, 3723; Victoria Fill, *Allen* 1717; between Corozal and Ancón, *Pittier* 6770; Culebra, *Hitchcock* 7922; Summit, *Standley* 26903, 30088; between Miraflores and Pedro Miguel, *Pittier* 2505; between Corozal and Ancón, *Pittier* 2184; Ancón, *Killip* 4111; Balboa, *Standley* 25635, 30893. PANAMÁ: Panamá, *Standley* 27673; Río Tecúmen, *Standley* 29488.

## 62. SETARIA Beauv.

SETARIA Beauv. Ess. Agrost. 51. *pl.* 13. *f.* 3. 1812. (Conserved).

*Chaetochloa* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4:38. 1897.

Spikelets subtended by one or more bristles, the spikelets deciduous, the bristles persistent; first glume broad, less than half as long as the spikelet, 3- to 5-nerved; second glume and sterile lemma nearly equal, slightly longer than the fruit, or the glume sometimes shorter; fruit indurate, smooth or rugose.

Annuals or perennials with flat, sometimes plaited blades, and spike-like, bristly panicles, or the panicles open with the spikelets rather crowded along the branches, some of the branches or branchlets reduced to sterile bristles around the spikelets.

- a. Blades plaited, narrowly elliptic; bristles usually below only some of the spikelets.
  - b. Plants annual; panicles 7–20 cm. long, narrow, the branches short, appressed, floriferous to the base; bristles 5–10 mm. long; spikelets 2.5 mm. long..... 1. *S. BARBATA*
  - bb. Plants perennial; panicles 40–70 cm. long, the lower branches distant, compound, ascending to spreading, as much as 25 cm. long..... 2. *S. PANICULIFERA*
- aa. Blades not plaited; bristles below all the spikelets.
  - b. Bristles more or less retrorsely scabrous.
    - c. Plants perennial; culms erect, densely tufted; spikelets subspherical, appearing inflated..... 3. *S. TENAX*
    - cc. Plants annual; culms decumbent-spreading or low-clambering.
      - d. Panicles 3–8 cm. long, about 5 mm. thick, dense; bristles commonly about 3 mm. long, retrorsely scabrous only at the tip, not implicate..... 4. *S. SCANDENS*
      - dd. Panicles as much as 15 cm. long, about 1 cm. thick; bristles 5–10 mm. long, prominently retrorsely scabrous above, somewhat flexuous, becoming implicate..... 5. *S. TENACISSIMA*
  - bb. Bristles antorsely scabrous only.
    - c. Panicles 2–10 cm. long, dense, spike-like, the axis pubescent and



- sparsely villous; bristles below each spikelet more than 5; culms slender, 20–100 cm. long..... 6. *S. GENICULATA*  
 cc. Panicles 15–30 cm. long, as much as 6 cm. wide, rather loose, the axis densely villous; bristles below each spikelet 1 or 2, 1–2 cm. long; culms coarse, as much as 2 m. long..... 7. *S. VULPISETA*

1. *SETARIA BARBATA* (Lam.) Kunth, Rév. Gram. 1:47. 1829.

- Panicum barbatum* Lam. Tabl. Encycl. 1:171. 1791.  
*Panicum costatum* Roxb. Fl. Ind. ed. Carey 1:314. 1820.  
*Panicum viaticum* Salzm. ex Doell, in Mart. Fl. Bras. 2<sup>2</sup>:155. 1877.  
*Chamaeraphis viatica* Kuntze, Rev. Gen. Pl. 2:770. 1891.  
*Chamaeraphis costata* Kuntze, Rev. Gen. Pl. 2:771. 1891.  
*Chaetochloa barbata* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18:348. 1917.

Annual; culms erect or usually decumbent-spreading and rooting at the lower nodes, 25 cm. in depauperate plants, to as much as 2 m. long, branching, usually pubescent or villous below the densely pubescent nodes; sheaths compressed, glabrous or papillose-hispid; ligule 1 mm. long, densely ciliate; blades elliptic, acuminate, narrowed at the base, scabrous and papillose-hispid, thin, plaited, as much as 30 cm. long, 3 cm. wide, in depauperate specimens 5–10 cm. long, 5–15 mm. wide, often obscurely plaited; panicles commonly 7–10 cm., or as much as 20 cm. long, the axis scabrous and sparsely villous, the short branches approximate, ascending to spreading, densely flowered to the base; spikelets about 2.5 mm. long, usually in pairs along the raceme-like branches, the bristles 5–10 mm. long; first glume obtuse or subacute, one-third as long as the spikelet, the second acute, 7-nerved, two-thirds as long as the spikelet; fruit elliptic, acute, strongly transversely rugose.

Introduced from tropical Asia; Florida, West Indies, Panama, and Brazil.  
 CANAL ZONE: Culebra, Standley 25954.

2. *SETARIA PANICULIFERA* (Steud.) Fourn. Mex. Pl. 2:42. 1886.

- Panicum sulcatum* Aubl. Pl. Guian. 1:50. 1775. Not *P. sulcatum* Bertol., 1820.  
*Panicum paniculiferum* Steud. Syn. Pl. Glum. 1:54. 1854.  
*Setaria effusa* Fourn. Mex. Pl. 2:42. 1886.  
*Chaetochloa sulcata* Hitchc. Contr. U. S. Nat. Herb. 17:260. 1913.  
*Setaria sulcata* A. Camus, Bull. Mus. Hist. Nat. 30: 108. 1924. Not *S. sulcata* Raddi, 1823.



Fig. 27  
*Setaria paniculifera*

Robust perennial; culms erect, 1.5–4 m. high; sheaths keeled toward the summit, papillose or papillose-hispid, especially along the margins and on the collar; blades conspicuously plicate, 0.5–1 m. long, 3–5 cm., or even 10 cm., wide, scabrous, acuminate, narrowed toward the base to the width of the sheath, sometimes petiole-like; panicles narrow or finally loose and open, 40–70 cm. long, the lower branches distant, compound, loosely to rather densely flowered, ascending to



spreading, as much as 25 cm. long, the upper shorter, approximate, nearly simple; spikelets 3 mm. long, pointed, the bristles about 15 mm. long; first glume obtuse, 3- to 5-nerved, about half as long as the spikelet, the second acute, 5- to 7-nerved, two-thirds as long as the spikelet; fruit narrow, acute, finely transversely rugose.

Thickets, river banks and swamps, Mexico and the West Indies to Colombia and Venezuela.

BOCAS DEL TORO: Changuinola Valley, *Dunlap* 245. CANAL ZONE: Barro Colorado Island, *Bailey & Bailey* 382; Gamboa, *Pittier* 6800; Summit, *D. H. Popenoe* 25; Bohio, *Hitchcock* 8391; Ancón, *Killip* 4025; Ancón Hill, *Killip* 4205; Culebra, *Hitchcock* 7935, 8122. PANAMÁ: Chepo River, *Killip* 4114. DARIÉN: Yapé, *Allen* 859.

3. *SETARIA TENAX* (L. Rich.) Desv. Opusc. 78. 1831.

*Panicum tenax* L. Rich. Act. Soc. Hist. Nat. Paris 1:106. 1792.

*Panicum impressum* Nees, Agrost. Bras. 247. 1829.

*Setaria impressa* Kunth, Rév. Gram. 1: Suppl. XII. 1830.

*Panicum sphaerocarpon* Salzm. ex Steud. Syn. Pl. Glum. 1:51. 1854. Not *P. sphaerocarpon* Ell., 1816.

*Panicum amphibolum* Steud. Syn. Pl. Glum. 1:51. 1854.

*Setaria biconvexa* Griseb. Fl. Brit. W. Ind. 555. 1864.

*Chaetochloa salzmanniana* Hitchc. Contr. U. S. Nat. Herb. 17:265. 1913.

*Chaetochloa impressa* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18:350. 1917.

*Setaria sphaerocarpa* F. T. Hubb. Contr. Gray Herb. (n. s.) 52:60. 1917.

*Chaetochloa tenax* Hitchc. Contr. U. S. Nat. Herb. 22<sup>3</sup>:176. 1920.

Densely tufted perennial; culms 1–1.5 m. high, stiffly erect, scabrous below the panicle; sheaths compressed, keeled, hirsute, hispid on the collar, all much longer than the internodes; ligule densely ciliate, about 2 mm. long; blades as much as 35 cm. long, 2 cm. wide, long-acuminate, narrowed toward the base, scabrous, especially on the margins; panicles 15–30 cm. long, erect, densely spike-like or rather loose, narrowed above, the axis scabrous and rather densely villous, the branches appressed or stiffly ascending, the lower ones 1.5–3 cm. long; bristles 1 or 2 below each spikelet, 1–2 cm. long, antrorsely and retrorsely barbed; spikelets 2–2.5 mm. long, subspherical, appearing inflated; first glume broad, obtuse or subacute, apiculate, 5-nerved; second glume two-thirds as long as the spikelet, obtuse; sterile lemma as long as the fruit, the palea well developed; fruit turgid, minutely crested, finely cross-wrinkled.

PANAMÁ: Taboga Island, *Hitchcock* 8085; *Killip* 4158; *Bro. Celestine* 87.

4. *SETARIA SCANDENS* Schrad. ex Schult. Mant. 2:279. 1824.

*Panicum scandens* Trin. Gram. Pan. 166. 1826.

*Panicum trinii* Kunth, Enum. Pl. 1:151. 1833.

*Panicum scandens*  $\alpha$ . *vulgare* Doell in Mart. Fl. Bras. 2<sup>2</sup>:171. 1877.

*Panicum scandens*  $\gamma$ . *longisetum* Doell in Mart. Fl. Bras. 2<sup>2</sup>:171. 1877.

*Chaetochloa scandens* Scribn. in Donn. Smith, Enum. Pl. Guat. 5:91. 1899.

Freely branching annual; culms slender, erect or geniculate-spreading, glabrous, the nodes often appressed-pilose, 25–80 cm. high; sheaths compressed, keeled, glabrous to pilose, the margins papillose-ciliate; ligule densely ciliate, about 1 mm. long; blades 5–15 cm. long, 4–10 mm. wide, acuminate, tapering to a narrow



base, scabrous and more or less pilose; panicles dense, spike-like, cylindrical, green or often purple, sometimes interrupted at the base, 3–8 cm. long, the axis scabrous or pubescent and also long-pilose, the branches very short; bristles at least partly retrorsely scabrous, especially at the tip, 3–6 mm. long, 1–3 below each spikelet; spikelets 1.5–1.7 mm. long, rather turgid; first glume about half as long as the spikelet, broad, acute or subobtuse, 3-nerved; second glume and sterile lemma nearly equal, 5-nerved, covering the fruit; fruit strongly plano-convex or sub-hemispheric, transversely rugose.

Open ground, fields, and waste places, West Indies; Guatemala to Paraguay.

PANAMÁ: Alhajuela, *Pittier 3463*.

5. *SETARIA TENACISSIMA* Schrad. ex Schult. Mant. 2:279. 1824.

*Panicum tenacissimum* Nees, Agrost. Bras. 238. 1829.

*Chaetochloa tenacissima* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18:352. 1917.

Annual; culms simple to rather freely branching, erect or leaning or clambering over vegetation, 30 cm. to as much as 2 m. long, glabrous, sometimes scabrous below the panicle; sheaths compressed, keeled, more or less antrorsely scabrous or nearly glabrous, the margins sometimes ciliate toward the summit; ligule densely ciliate, about 0.5 mm. long; blades 6–20 cm. long, 4–10 mm., or sometimes 15 mm., wide, long-acuminate, firm, very scabrous, especially on the margins, and also pilose; panicles 5–15 cm. long, more or less flexuous, green or usually tinged with purple, the axis densely pubescent and sparsely pilose; bristles one below each spikelet, 5–10 mm. long, prominently retrorsely scabrous above, antrorsely below, flexuous, becoming implicate and tangled; spikelets 1.5 mm. long, usually purple; first glume half as long as the spikelet, 3-nerved, the second glume and sterile lemma equal, 5-nerved, covering the finely transversely rugose fruit.

River banks and brushy slopes, West Indies; Guatemala to Brazil.

CHIRIQUÍ: El Boquete, *Hitchcock 8291*; Bajo Boquete, *Killip 4564*.

6. *SETARIA GENICULATA* (Lam.) Beauv. Ess. Agrost. 51:178. 1812.

*Panicum geniculatum* Lam. Encycl. 4:727. 1798.

*Setaria gracilis* H.B.K. Nov. Gen. & Sp. 1:109. 1815.

*Panicum imberbe* Poir. in Lam. Encycl. Suppl. 4:272. 1816.

*Panicum flavum* Nees, Agrost. Bras. 238. 1829.

*Chaetochloa imberbis* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4:39. 1897.

*Chaetochloa imberbis geniculata* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21:12. 1900.

*Chaetochloa geniculata* Millsp. & Chase, Field Mus. Bot. 3:37. 1903.

For complete synonymy see Contr. U. S. Nat. Herb. 22<sup>3</sup>:168-171. 1920; Hitchcock, U. S. Dept. Agr. Misc. Publ. 200. 1935.

Densely tufted perennial; culms erect or geniculate-spreading, from short knotty rhizomes, 20 cm. to more than 1 m. long, branching at the lower nodes, glabrous; sheaths keeled, glabrous or scabrous toward the summit; ligule 0.5–1 mm. long, densely minutely ciliate; blades mostly 5–15 cm. long, 4–6 mm. wide, flat, acuminate, scabrous, often sparsely villous on the upper surface toward the



base; panicles dense, narrow, spike-like, yellow, purple, tawny, or greenish, mostly 2–6 cm. long, or as much as 10 cm. long on robust plants, the axis densely pubescent and sparsely villous; bristles below each spikelet 5 or more, commonly 5–10 mm. long, sometimes not longer than the spikelets; spikelets 2–2.5 mm., or even 3 mm., long, ovoid; first glume one-third as long as the spikelet, 3-nerved; second half to two-thirds as long as the spikelet, 5-nerved; sterile lemma acute, as long as the fruit, 5- to 7-nerved, the palea well developed, sometimes with a staminate flower; fruit strongly transversely rugose.

Open ground, cultivated soil, and waste places, United States and the West Indies to Argentina; also in the Old World.

BOCAS DEL TORO: *Carleton* 30; Laguna de Chiriquí, *von Wedel* 1125; Isla Colón, *von Wedel* 2837. CHIRIQUÍ: El Boquete, *Hitchcock* 8171, 8285; *Pittier* 3042; *Woodson & Schery* 717, 762; Cerro Vaca, *Pittier* 5344. CANAL ZONE: Mount Hope Cemetery, *Standley* 28806; Gatún, *Hitchcock* 9173; New Frijoles, *Pittier* 6840; Barro Colorado Island, *Bailey & Bailey* 630; Gamboa, *Pittier* 4792; Empire, *Pittier* 3719; Culebra, *Hitchcock* 7921; *Pittier* 4444; Corozal, *Killip* 4104, 4251; Ancón, *Piper* 5230; *Killip* 4021; Ancón Hill, *Killip* 4016; *Standley* 26359. PANAMÁ: Matías Hernández, *Pittier* 6759; Arraiján, *Woodson, Allen & Seibert* 1390; Chepo, *Hunter & Allen* 69; Taboga Island, *Hitchcock* 8062.

7. *SETARIA VULPISETA* (Lam.) Roem. & Schult. Syst. Veg. 2:495. 1817.

*Panicum vulpisetum* Lam. Encycl. 4:735. 1798.

*Setaria composita* H.B.K. Nov. Gen. & Sp. 1:111. 1815.

*Setaria polystachya* Schrad. ex Schult. Mant. 2:277. 1824.

*Panicum compositum* Nees, Agrost. Bras. 244. 1829.

*Panicum macrourum* Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 1:227. 1834.

*Panicum amplifolium* Steud. Syn. Pl. Glum. 1:53. 1854.

*Panicum subsphaerocarpum* Salzm. ex Schlecht. Linnaea 31:483. 1862.

*Chamaeraphis setosa* var. *vulpiseta* Kuntze, Rev. Gen. Pl. 2:769. 1891.

*Chamaeraphis composita* Kuntze ex Beal, Grasses N. Amer. 2:154. 1896.

*Chaetochloa composita* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4:39. 1897.

*Chaetochloa vulpisetata* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18:350. 1917.

Coarse perennial; culms in large tufts, erect or geniculate and rooting at the lower nodes, branching, as much as 2 m. high, glabrous; sheaths usually much longer than the internodes, compressed, keeled, glabrous to rather densely hirsute, with a dense hispid line on the collar; ligule densely hispid, 2 mm. long; blades as much as 50 cm. long, 2–3.5 cm. wide, acuminate, narrowed to a usually rather long, often petiolate base, scabrous, especially on the lower surface, the margins sharply scabrous; panicles 15–30 cm. long, as much as 6 cm. wide including the bristles, somewhat narrowed toward the apex, the axis densely villous, the branches slender, compound, crowded, ascending or spreading; bristles 1 to 2 below each spikelet, 1–2 cm. long, yellowish or brownish; spikelets 2–2.5 mm. long; first glume obtuse or acutish, 3-nerved, about half as long as the spikelet, the second obtuse, 7-nerved, about two-thirds as long as the spikelet; sterile lemma as long as the spikelet, 5-nerved; fruit rather strongly transversely rugose, acute, minutely crested.



Open ground, moist thickets and brushy slopes, southern Mexico and the West Indies to Peru and Argentina.

Common, often growing in colonies.

BOCAS DEL TORO: Changuinola Valley, *Dunlap* 200; *Stork* 271; Water Valley, *von Wedel* 1615. CANAL ZONE: Toro Point, *Hitchcock* 8046; Fort Kobe, *Allen* 2025; Rio Pequení, *Woodson*, *Allen* & *Seibert* 1627; Gatún River Valley, *Pittier* 6850; Frijoles, *Standley* 27660; Barro Colorado Island, *Standley* 41172; *Kenoyer* 111; *Bailey* & *Bailey* 330; Gorgona, *Maxon* 4734; Obispo, *Standley* 31734; between Las Cascadas and Bas Obispo, *Pittier* 3744; Culebra, *Hitchcock* 7898, 7906, 7926, 8026; *Pittier* 2121; Summit, *Standley* 26958, 30058; Miraflores, *Greenman* & *Greenman* 5180; Red Tank to Pueblo Nuevo, *Piper* 5228; between Fort Clayton and Corozal, *Standley* 29145; Corozal, *Killip* 4023; Balboa, *Standley* 26059, 29310. PANAMÁ: Taboga Island, *Hitchcock* 8093; *Standley* 27927. SAN BLAS: Puerto Obaldía, *Pittier* 4332.

### 63. PENNISETUM L. Rich.

PENNISETUM L. Rich. in *Pers. Syn. Pl.* 1:72. 1805.

*Gymnothrix* Beauv. *Ess. Agrost.* 59. *pl.* 13. *f.* 6. 1812.

Spikelets solitary or in groups of 2 or 3, the groups enclosed in a fascicle of bristles, these united only at the base, often plumose, falling attached to the spikelets; first glume much shorter than the spikelet, sometimes minute or wanting, thin, 1-nerved; second glume and sterile lemma subequal, or the glume a little shorter, 5-nerved; fruit subindurate, smooth and shining, the margins of the lemma thin and flat.

Annuals or perennials, sometimes rather woody, with flat blades and dense spike-like panicles.

- |   |                   |
|---|-------------------|
| a. Bristles plumose; spikelets 3.2–4 mm. long.....    | 1. P. SETOSUM     |
| aa. Bristles not plumose; spikelets 6–7 mm. long..... | 2. P. COMPLANATUM |

1. PENNISETUM SETOSUM (Swartz) L. Rich. in *Pers. Syn. Pl.* 1:72. 1805.

*Cenchrus setosus* Swartz, *Prodr. Veg. Ind. Occ.* 26. 1788.

*Panicum cenchroides* L. Rich. *Act. Soc. Hist. Nat. Paris* 1:106. 1792.

*Pennisetum purpurascens* H.B.K. *Nov. Gen. & Sp.* 1:113. 1815.

*Pennisetum uniflorum* H.B.K. *Nov. Gen. & Sp.* 1:114. *pl.* 34. 1815.

*Panicum densispica* Poir. in *Lam. Encycl. Suppl.* 4:273. 1816.

*Panicum triticoides* Poir. in *Lam. Encycl. Suppl.* 4:274. 1816.

*Setaria cenchroides* Roem. & Schult. *Syst. Veg.* 2:495. 1817.

*Pennisetum triticoides* Roem. & Schult. *Syst. Veg.* 2:877. 1817.

*Gymnothrix geniculata* Schult. *Mant.* 2:284. 1824.

*Pennisetum alopecuroides* Desv. ex *Hamilt. Prodr. Pl. Ind. Occ.* 11. 1825.

*Pennisetum richardi* Kunth, *Rév. Gram.* 1:49. 1829.

*Pennisetum sieberi* Kunth, *Rév. Gram.* 1:50. 1829.

*Pennisetum hirsutum* Nees, *Agrost. Bras.* 284. 1829.

*Pennisetum pallidum* Nees, *Agrost. Bras.* 285. 1829.

*Pennisetum flavescens* Presl, *Rel. Haenk.* 1:316. 1830.

*Pennisetum dasistachyum* Desv. *Opusc.* 76. 1831.

*Pennisetum hamiltonii* Steud. *Nom. Bot.* ed. 2. 2:297. 1841.

*Pennisetum nicaraguense* Fourn. *Bull. Soc. Bot. France* II. 27:293. 1880.

*Pennisetum indicum* var. *purpurascens* Kuntze, *Rev. Gen. Pl.* 2:787. 1891.



Coarse perennial in large loose clumps; culms erect or ascending, sometimes geniculate at the lower nodes, bearing 1 to several branches from the lower and

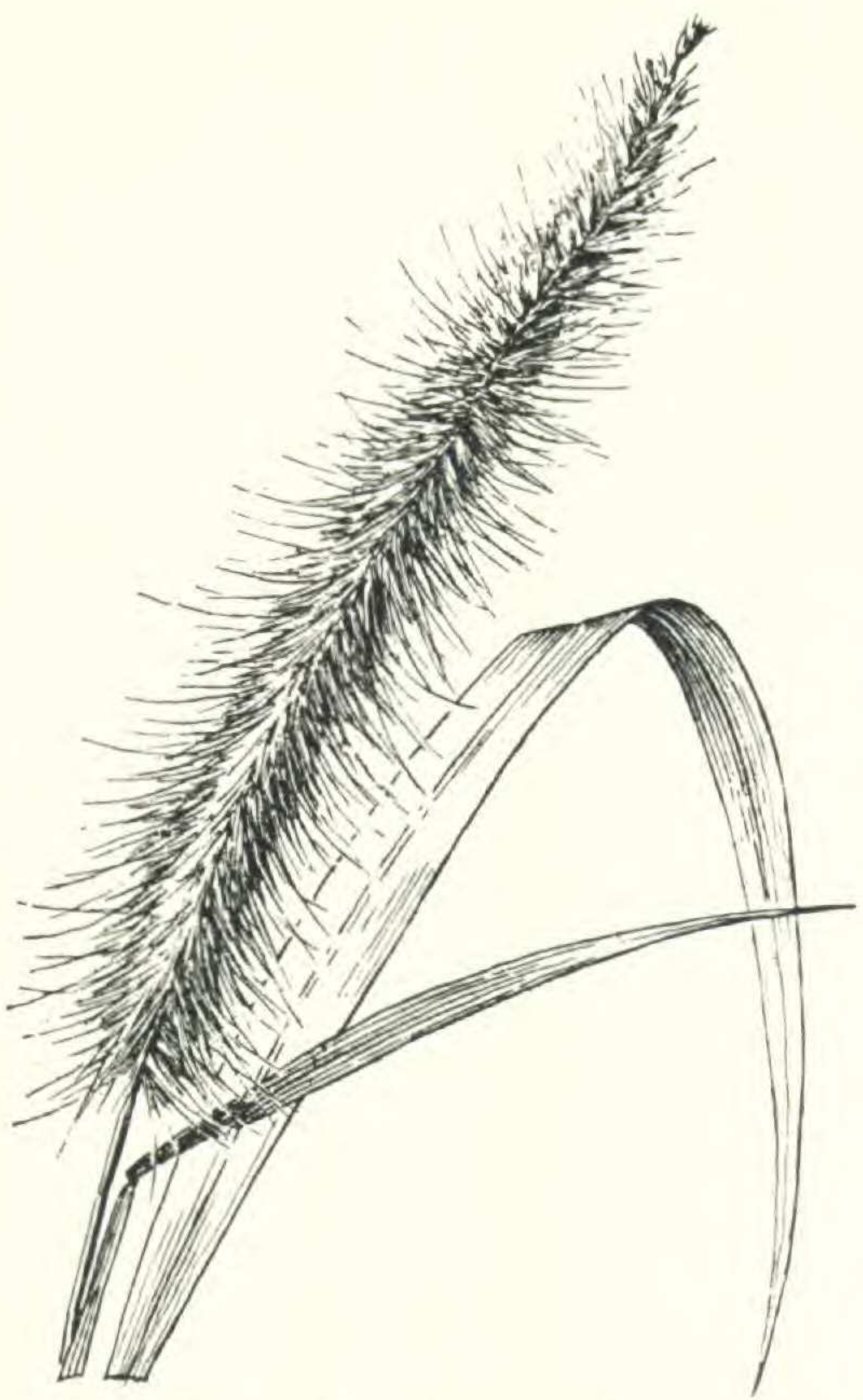


Fig. 28. *Pennisetum setosum*

middle nodes, glabrous; sheaths much shorter than the internodes, usually glabrous or occasionally papillose-hirsute, sometimes ciliate on the margins near the summit; ligule membranaceous-ciliate, 2-3 mm. long; blades 10-40 cm. long, 4-18 mm. wide, long-acuminate, scabrous to densely papillose-hirsute, papillose-hispid on the margins near the base; panicles 10-25 cm. long, dense, usually somewhat nodding, pale yellow to purple or brown, the axis slender, obscurely scabrous; fascicles ascending, reflexed at maturity, containing 1 spikelet; bristles appressed to the spikelet, unequal, the outer ones slender, shorter than the spikelet, the inner ones stouter, as much as 12 mm. long, densely plumose below, scabrous above; spikelets 3.2-4 mm. long, sessile; first glume minute or obsolete; second glume longer than the sterile lemma, acuminate or obscurely lobed; sterile lemma truncate at the

apex, the palea well developed and sometimes containing a staminate flower; fruit indurate, 2-3 mm. long, smooth and shining, the lemma and palea ciliate at the apex.

Savannas and open or brushy slopes, West Indies; Florida and southern Mexico to Bolivia and Brazil.

CANAL ZONE: Sosa Hill, Balboa, *Standley 25238, 26429*. PANAMÁ: Taboga Island, *Hitchcock 8095*.

2. *PENNISETUM COMPLANATUM* (Nees) Hemsl. *Biol. Centr. Amer. Bot.* 3:507. 1885.

*Gymnothrix complanata* Nees, *Bonplandia* 3:83. 1855.

*Gymnothrix mexicana* Fourn. *Mex. Pl.* 2:48. 1886.

*Gymnothrix grisebachiana* Fourn. *Mex. Pl.* 2:48. 1886.

Coarse, somewhat woody perennial; culms erect or ascending from strong rhizomes, sometimes geniculate at the lower nodes, simple, or sparingly branching, mostly 1-2 m. high, sometimes dwarf; sheaths usually as long as or longer than the internodes, loose, keeled toward the summit, glabrous, or the margins pilose above; ligule densely ciliate, about 2 mm. long; blades elongate, attenuate, 5-8 mm., or even 10 mm., wide, very scabrous; panicles 7-16 cm. long, nodding or flexuous, the spikelets pale, the bristles tawny or purple; fascicles ascending, containing 1 spikelet, the bristles usually numerous, slender, 12-15 mm. long, the



innermost stouter, 15–25 mm. long; spikelets 6–7 mm. long, acuminate, minutely scabrous; first glume thin, 1-nerved, acute or obtuse, about one-third as long as the spikelet; second glume 5-nerved, three-fourths as long as the spikelet; sterile lemma 5-nerved, acuminate, a little shorter than the fruit, enclosing a palea and sometimes a staminate flower; fruit acuminate, the lemma scabrous above, the palea pubescent, the tip not enclosed.

Dry slopes and savannas, southern Mexico (Veracruz) to Panama.

CHIRIQUÍ: El Boquete, *Hitchcock 8250*. WITHOUT LOCALITY: *Seeman 1560* (TYPE).

#### 64. CENCHRUS L.

CENCHRUS L. Sp. Pl. 1049. 1753.

*Rarum* Adans. Fam. Pl. 2:35, 597. 1763.

*Cenchropsis* Nash in Small, Fl. Southeast. U. S. 109. 1903.

Spikelets sessile, enclosed in spiny burs composed of united sterile branches, the burs falling entire, the body of the bur irregularly lobed, the lobes rigid, the spines barbed; spikelets 1 to several in each bur, usually glabrous; first glume narrow, 1-nerved, much shorter than the spikelet, sometimes wanting; second glume and sterile lemma nearly equal, 3- to 5-nerved, the lemma enclosing a palea and usually a staminate flower; fruit indurate, the lemma acuminate, the margins thin, flat.

Annuals or perennials with terminal racemes of burs.

- |  |                   |
|--|-------------------|
| a. Burs subtended by a ring of slender bristles; spikelets 3 or 4 in each bur.                                       |                   |
| b. Burs not more than 4 mm. wide, densely crowded in a long spike, the lobes interlocking; first glume obsolete..... | 1. C. BROWNII     |
| bb. Burs 5–7 mm. wide, not crowded, the lobes usually erect; first glume present.....                                | 2. C. ECHINATUS   |
| aa. Burs not subtended by a ring of slender bristles; spikelets usually 2 in each bur.....                           | 3. C. PAUCIFLORUS |

1. CENCHRUS BROWNII Roem. & Schult. Syst. Veg. 2:258. 1817.

*Cenchrus inflexus* R. Br. Prodr. Fl. Nov. Holl. 1:195. 1810. Not *C. inflexus* Poir., 1804.

*Cenchrus viridis* Spreng. Syst. Veg. 1:301. 1825.

*Cenchrus echinatus* var. *viridis* Spreng. ex Griseb. Fl. Brit. W. Ind. 556. 1864.

Annual; culms erect to decumbent-spreading and rooting at the lower nodes, simple to freely branching; sheaths mostly longer than the internodes, compressed,



Fig. 29. *Cenchrus brownii*

keeled, glabrous; ligule ciliate, less than 1 mm. long; blades 10–30 cm. long, mostly 6–8 mm., or sometimes as much as 12 mm. wide, scabrous to nearly glabrous; spikes 4–10 cm. long, dense, the axis minutely scabrous or pubescent; burs about 4 mm. wide, subtended by a ring of slender irregular bristles, the lobes pubescent, interlocking; spikelets usually 3 in each bur, 4–4.5 mm. long; first glume obsolete; second



glume two-thirds to three-fourths as long as the subequal sterile lemma and fruit; fruit acuminate, minutely roughened, the nerves evident near the tip.

Common in open ground, often a weed in cultivated ground and waste places, Florida, Mexico, and the West Indies to Bolivia and Brazil; also in Australia and south Pacific islands.

Often called pega-pega and cadillo in Panama.

CHIRIQUÍ: Puerto Armuelles, Woodson & Schery 839. COLON: Colón, Rose 22082. CANAL ZONE: Toro Point, Hitchcock 8043; Monte Lirio, Maxon 6846; Barro Colorado Island, Standley 31244; Empire, Pittier 3716; Culebra, Hitchcock 7914; Pittier 2080; Pedro Miguel, Allen 5; Corozal, Piper 5264; Ancón, Killip 4007; Standley 26323; Piper 5249; Balboa, Standley 27406. PANAMÁ: Matías Hernández, Pittier 6790; Panamá, Piper 5284; Taboga Island, Hitchcock 8064; Killip 4149; Standley 27873; Piper 5284.

## 2. *CENCHRUS ECHINATUS* L. Sp. Pl. 1050. 1753.

*Cenchrus pungens* H.B.K. Nov. Gen. & Sp. 1:115. 1815.

*Cenchrus brevisetus* Fourn. Mex. Pl. 2:50. 1886.

*Cenchrus echinatus brevisetus* Scribn. in Millsp. Field Mus. Bot. 2:26. 1900.

Annual; culms erect to geniculate or decumbent-spreading, often rooting at the nodes, branching, as much as 1 m. long, glabrous; sheaths compressed, keeled, glabrous, or ciliate on the margins near the summit; ligule ciliate, 1 mm. long; blades mostly 6–20 cm. long, 3–8 mm. wide, acuminate, more or less pilose; spikes 3–10 cm. long, the axis rather stout, flexuous, scabrous; burs scarcely crowded, 4–7 cm. long, usually broader than long, pubescent, containing 3–6 spikelets, the bristles below the bur fewer and stouter than in *C. brownii*, the lobes or spines erect to spreading, retrorsely barbed at the tip; spikelets 4.5–6 mm. long; first glume small, narrow, 1-nerved, the second two-thirds to three-fourths as long as the nearly equal fruit and sterile lemma; fruit acuminate, the nerves of the lemma apparent near the tip.

Open, especially sandy, ground, and waste places, southern United States and the West Indies to Argentina.

CANAL ZONE: between Mindi and Colón, Hitchcock 7949; Frijoles, Standley 27649; Ancón, Bro. Celestine 27; Balboa, Hitchcock 7994, 8001; Maxon 6837; Standley 30875. PANAMÁ: Bella Vista, Standley 25376; Taboga Island, Woodson, Allen & Seibert 1540.

## 3. *CENCHRUS PAUCIFLORUS* Benth. Bot. Voy. Sulph. 56. 1840.

*Cenchrus roseus* Fourn. Mex. Pl. 2:50. 1886.

*Cenchrus echinatus* forma *longispina* Hack. in Kneucker, Allg. Bot. Zeitschr. 9:169. 1903.

Similar in habit and aspect to the preceding but commonly with shorter and narrower blades; spikes usually 3–8 cm. long, short-exserted or partly included in the sheath; burs 3–7 mm. wide, pubescent or nearly glabrous, with no ring of slender bristles at the base, the lobes flat at the base, erect or spreading, sometimes inflexed, usually enclosing two spikelets; spikelets 5–7 mm. long; first glume narrow, about one-third as long as the spikelet; second glume and sterile lemma subequal or the lemma as long as the acuminate fruit.

Open sandy ground, United States and the West Indies to Argentina.

PANAMÁ: Point Chamé, Hitchcock 8164.



## 65. LITHACHNE Beauv.

LITHACHNE Beauv. Ess. Agrost. 135. *pl.* 24. *f.* 2. 1812.

Plants monoecious; panicles small, the terminal staminate or wanting, the axillary composed of 1 pistillate spikelet and several staminate spikelets below it; pistillate spikelet: first glume wanting; second glume and sterile lemma nearly equal, acuminate, 5- to 7-nerved; fruit laterally compressed, bony-indurate, white, smooth and shining, the lemma gibbous, the margins tightly enclosing the convex palea; staminate spikelets reduced to the lemma and palea.

Wiry perennials with broad asymmetrical blades and small terminal and axillary panicles.

1. LITHACHNE PAUCIFLORA (Swartz) Beauv. ex Poir. Dict. Sci. Nat. 27:60. 1823.

*Olyra pauciflora* Swartz, Prodr. Veg. Ind. Occ. 21. 1788.

*Olyra axillaris* Lam. Encycl. 4:547. 1797.

*Lithachne axillaris* Beauv. Ess. Agrost. 166. *pl.* 24. *f.* 2. 1812.



Fig. 30. *Lithachne pauciflora*

Slender erect perennial; culms tufted, woody, 25–50 cm. high, more or less geniculate at the lower nodes; sheaths, except the uppermost, shorter than the



internodes, glabrous or minutely pubescent, sometimes ciliate on the margin, the lower ones bladeless; ligule ciliate, about 1 mm. long; blades asymmetrical, acuminate, 5–8 cm. long, 1.5–2.5 cm. wide, glabrous, the margins scabrous; staminate spikelets 4–6 mm. long, acuminate; pistillate spikelets about 10 mm. long, the second glume a little longer than the sterile lemma; fruit 4–5 mm. long, triangular-gibbous, smooth and shining, white, or sometimes mottled brown.

Moist rich woods, Mexico and the West Indies to Panama; Brazil to Argentina.  
CHIRIQUÍ: El Boquete, *Hitchcock 8310*. CANAL ZONE: Culebra, *Hitchcock 9211*.

#### 66. RADDIA Bertol.

RADDIA Bertol. Opusc. Sci. Bologna 3:410. 1819.

*Strepbium* Schrad. in Nees, Agrost. Bras. 298. 1829.

Plants monoecious, the staminate and pistillate spikelets in small separate inflorescences, the staminate terminal and axillary, the pistillate all axillary from the middle and upper nodes; staminate spikelets lanceolate, acute or acuminate, the glumes and sterile lemma wanting; first glume of pistillate spikelet wanting; second glume and sterile lemma membranaceous, equal, acute or acuminate; fruit sessile, indurate, the margins of the lemma firmly enclosing the palea.

Slender, erect or spreading perennials with short, broad, flat blades and small few-flowered panicles partly enclosed in the sheaths.

1. RADDIA NANA (Doell) Chase, Proc. Biol. Soc. Washington 21:185. 1908.

*Olyra nana* Doell in Mart. Fl. Bras. 2<sup>2</sup>:329. 1877.

Delicate perennial; culms 10–40 cm. long, very slender, lax or straggling, naked below, simple, or branching from the upper nodes, appressed-pubescent to glabrous, the lower internodes elongate, the upper very much shorter; sheaths pubescent, often pilose on the margins, the lower much shorter, the upper about as long as or a little longer than the internodes; blades very shortly petiolate, 10–20 mm. long, 5–7 mm. wide, spreading or reflexed, oblong-triangular, rounded at the apex, the tip abruptly acute or mucronate, the base truncate, ciliate; racemes very small, axillary, 2- to 3-flowered, all partly enclosed in the sheaths; staminate spikelets 3–4 mm. long, green, glabrous; pistillate spikelets 2 mm. long, brown, densely pubescent with white hairs; second glume and sterile lemma acute, slightly longer than the fruit; fruit obovate, acute, plump, smooth and shining.

Wet savannas, shady stream banks and crevices of rocks, Trinidad, Panama, Venezuela, and Brazil.

PANAMÁ: Hacienda La Joya, *Dodge, Hunter, Steyermark & Allen 16882*.

#### 67. CRYPTOCHLOA Swallen

CRYPTOCHLOA Swallen, Ann. Mo. Bot. Gard. 29:317. 1942.

Monoecious; inflorescences small, usually partly hidden in the upper sheaths, each bearing both staminate and pistillate spikelets in no definite arrangement;



staminate spikelet: glumes and sterile lemma wanting; lemma and palea acute or acuminate, thin, the lemma 1-nerved; stamens 3; pistillate spikelet: first glume wanting; second glume and sterile lemma acuminate, subequal, 3- or usually 5-nerved, the lateral nerves approximate, finely transversely veined; fertile floret subcylindrical, raised on the enlarged and thickened segment of the rachilla; lemma firm, subindurate, smooth and shining, gradually narrowed to a blunt tip, the margins not inrolled; palea as long as the lemma, similar in texture.

Low perennials with broad flat blades usually crowded toward the top of the slender wiry culms.

1. *CRYPTOCHLOA VARIANA* Swallen, Ann. Mo. Bot. Gard. 29:318, *with f.* 1942.

Culms in small dense tufts, wiry, 10–20 cm. high, erect to spreading, often geniculate at the densely pubescent nodes, glabrous, or pubescent below the nodes, the lower internodes somewhat elongate, the upper ones much shorter, completely hidden by the overlapping sheaths; sheaths keeled, pubescent toward the summit



Fig. 31. *Cryptochloa variana*

and on the margins, nearly glabrous on the back, often auriculate, the auricle fused with the ligule, the lower ones bladeless or with very much reduced blades; ligule 1–3 mm. long, membranaceous, obtuse, puberulent on the back or nearly glabrous; blades 3–5 on each culm, crowded toward the summit, 3–5 cm. long, 8–13 mm. wide, oblong-lanceolate, rather abruptly narrowed to an acute or acuminate tip, broad and rounded at the base, with a densely pubescent petiole



about 1 mm. long, minutely pubescent on both surfaces or sometimes only obscurely puberulent; inflorescences terminal and axillary, partly enclosed in the sheaths, 2-3 cm. long, bearing 1-6 pistillate spikelets, the branches closely appressed, usually pubescent; staminate spikelets 2.5 mm. long, the lemma subacute, the palea as long as or slightly longer than the lemma; anthers 1 mm. long; pistillate spikelet 7-8.5 mm. long, the pedicel 4-10 mm. long, relatively stout, much enlarged toward the summit; second glume and sterile lemma 3-nerved, with a few fine transverse nerves, glabrous or obscurely scaberulous, the second glume acute, the sterile lemma acute or subacuminate, slightly exceeding the second glume; fruit 6.5-7 mm. long, 2 mm. broad, subcylindrical, broadest above the middle, gradually narrowed to a blunt tip, smooth, shining, gray-greenish, at maturity mottled with darker drab; caryopsis 4.5 mm. long, light brown.

Forests, Panama and Colombia.

COCLÉ: El Valle de Antón, *Allen 2201* (TYPE). CANAL ZONE: Madden Reservoir, *Muenschler 12212*.

#### 68. OLYRA L.

OLYRA L. *Syst. Nat.* ed. 10. 2:1261. 1759.

Plants monoecious; staminate and pistillate spikelets in the same inflorescence, the pistillate on the upper branches and at the ends of the lower branches, the staminate scattered along the lower branches; pedicels of pistillate spikelets enlarged toward the summit; pistillate spikelet: first glume wanting; second glume and sterile lemma 5- to 7-nerved, caudate-acuminate, the glume much longer than the lemma; fruit bony-indurate, white, the margins inrolled, clasping the palea; staminate spikelets much smaller, reduced to the lemma and palea.

Erect or clambering, usually woody perennials with broad flat blades and open panicles terminating the main culm and branches.

1. OLYRA LATIFOLIA L. *Syst. Nat.* ed. 10. 2:1261. 1759.

*Olyra paniculata* Swartz, *Prodr. Veg. Ind. Occ.* 21. 1788.

*Olyra arundinacea* H.B.K. *Nov. Gen. & Sp.* 1:197. 1816.

*Olyra latifolia* var. *arundinacea* Griseb. *Fl. Brit. W. Ind.* 535. 1864.

Woody perennial; culms erect, freely branching from the upper nodes, as much as 5 m. long, the branches often clambering over the surrounding vegetation; sheaths glabrous, pubescent or hispid, usually longer than the internodes, the lower ones of the main culm short, nearly bladeless; blades asymmetrical, 10-30 cm. long, 2-9.5 cm. wide, or those of the branches smaller, acuminate, scabrous, short-petiolate, the petioles hispid; panicles 5-15 cm. long, terminal on the main culm and branches, sometimes axillary from the upper sheath, the branches usually narrowly ascending, with a single pistillate spikelet at the end, the staminate spikelets scattered on short branchlets below it; staminate spikelets 5 mm. long, the lemma awned, the awn 2-3 mm. long; second glume and sterile lemma of the



pistillate spikelets 10–25 mm. long, long-acuminate, divergent, exposing the fruit; fruit 5–6 mm. long, smooth and shining, white to drab.

Moist woods and thickets, Florida, Mexico, and the West Indies to Bolivia and Argentina.

BOCAS DEL TORO: Isla Colón, *von Wedel* 1343; Old Bank Island, *von Wedel* 1974; Pumpkin River, *von Wedel* 2567. CHIRIQUÍ: San Felix, *Pittier* 5206; San Bartolomé, *Woodson & Schery* 882. COLÓN: Santa Isabel, *Pittier* 4151; Palenque, *Pittier* 4126. CANAL ZONE: Fort Lorenzo, *Piper* 5949; Gatún, *Hitchcock* 7983; Río Abajo, *Bartlett & Lasser*, 16399; Frijoles, *Pittier* 2686, 3759; *Standley* 27533; Barro Colorado Island, *Standley* 31335; *Bailey & Bailey* 17; Pedro Miguel to Culebra, *Hitchcock* 7919; East Paraíso, *Standley* 29937; Ancón, *Piper* 5226; Chivi-Chivi Trail near Red Tank, *Piper* 5229; *Maxon & Harvey* 6580; Balboa, *Standley* 25437. PANAMÁ: Alhajueta, *Pittier* 2339, 3470; Juan Díaz, *Standley* 30607; *Killip* 4089; Panamá, *Hitchcock* 8101; Matías Hernández, *Pittier* 6643; Río Indio, trail to Chico, *Steyermark & Allen* 17458; Pedro Gonzales, Perlas Islands, *Allen* 2596.

#### 69. PARIANA Aubl.

PARIANA Aubl. Pl. Guian. 2:876. *pl.* 337. 1775.

Spikelets unisexual, arranged in whorls at the nodes of a readily disarticulating axis, the whorls falling entire, each composed of 1 pistillate spikelet surrounded and enclosed by 4 or 5 staminate spikelets; pedicels of staminate spikelets thickened, indurate, united; staminate spikelets dorsally compressed; glumes acute or acuminate, 1- to 3-nerved, one-third to half as long as the spikelet; lemma broad, 3-, rarely 5-, nerved, acute to obtuse; stamens numerous; pistillate spikelet completely hidden by the staminate spikelets; glumes thin, acute, 1- to 3-nerved; fruit indurate, resembling that of *Olyra*.

Perennials with broad flat blades and terminal spikes. Culms dimorphic (in our species), the sterile ones leafy, the fertile ones leafless.

- |   |                |
|---|----------------|
| a. Blades 2–2.5 cm. wide; sheaths fimbriate in the mouth; glumes of staminate spikelets 2–3 mm. long, 2- to 3-nerved, the lemma 4 mm. long.....   | 1. P. SIMULANS |
| aa. Blades 4.5–5.3 cm. wide; sheaths not fimbriate in the mouth; glumes of staminate spikelet 4–5 mm. long, 1-nerved, the lemma 5–6 mm. long..... | 2. P. STRIGOSA |

1. PARIANA SIMULANS Tutin, Jour. Linn. Soc. Bot. 50:357. *f.* 22. *pl.* 10. 1936.

Erect tufted perennial; sterile culms about 60 cm. high; lower sheaths much shorter than the long internodes, bladeless, that of the midculm with a well-developed blade, the upper ones crowded, fimbriate in the mouth, the bristles about 1 cm. long; blades 8–12 cm. long, 2–2.5 cm. wide, acuminate, glabrous; fertile culms about 30 cm. high, weak and soft, hidden under the foliage of the sterile culms; sheaths loose, inflated, glabrous, about half as long as the internodes, bladeless; spike about 4 cm. long, scarcely exerted from the upper sheath; staminate spikelets: pedicels 3 mm. long, ciliate on the margins; glumes 2–3 mm. long, 2- to 3-nerved, triangular-acuminate; lemma 4 mm. long, 1.5 mm. wide, oblong, abruptly subacute; fertile spikelets: glumes lanceolate-acuminate, 6 mm. long; fruit ovate, 5 mm. long, puberulent.



Forests, Costa Rica, Panama and Colombia.

COLÓN: Loma de la Gloria, *Pittier 4075* (TYPE). CANAL ZONE: Quebrada Culebra, *Dodge & Allen 17058*. This collection is doubtfully referred to *P. simulans*. The blades are wider, as much as 3.5 cm. wide, and there are no fimbriate bristles at the mouth of the sheaths. The inflorescence, however, is identical.

2. *PARIANA strigosa* Swallen, sp. nov.

Perennis culmis dimorphis; culmi steriles 40–65 cm. alti, infra nodos strigosi; vaginae inferiores internodiis multo breviores, strigosae, superiores internodiis longiores non fimbriatae; ligula truncata, ca. 2 mm. longa; laminae ovatae vel ovato-lanceolatae, acuminatae, 12–15 cm. longae, 4.5–5.3 cm. latae, marginibus scabris, infra glaucescentibus; culmi fertiles ca. 45 cm. alti, debiles, efoliati; spica 7 cm. longa; spiculae masculae: glumae 4–5 mm. longae, acuminatae, 1-nerves; lemma 5–6 mm. longum, abrupte subacutum viride vel purpurascens; spiculae feminae: glumae 6 mm. longae, 1-nerves, acutae, pubescentes; fructus 5 mm. longus, ovatus, abrupte subacutus.

Tufted perennial with dimorphous culms; sterile culms 40–65 cm. high, strigose below the nodes; lower sheaths much shorter than the internodes, strigose, the upper ones overlapping but not crowded, not fimbriate in the mouth; ligule truncate, about 2 mm. long; blades 2–3 at the summit of the culms, not crowded, ovate to ovate-lanceolate, acuminate, 12–15 cm. long, 4.5–5.3 cm. wide, scabrous at the tip and on the margins, grayish-green above, glaucous below; fertile culms about 45 cm. high, weak, soft, bladeless; spike 7 cm. long; staminate spikelets: pedicels 2–3 mm. long, villous at the base; glumes 4–5 mm. long, 1-nerved, narrow, acuminate; lemma 5–6 mm. long, oblong, abruptly subacute, tinged with purple; fertile spikelet: glumes 6 mm. long, 1-nerved, acute, thin, pubescent; fruit 5 mm. long, ovate, abruptly subacute.

PANAMÁ: Río Indio, in "forest along small unnamed quebrada entering lake at 70 m. level, 70–80 m.," *Dodge & Allen 17301* (U. S. Nat. Herb., TYPE).

Known only from the type collection.

70. *IMPERATA* Cyrillo

*IMPERATA* Cyrillo, Pl. Rar. Neap. 2:26. 1792.

Spikelets all alike, in pairs, unequally pedicellate on a slender continuous rachis of a raceme, surrounded at the base by long silky hairs much longer than the spikelets; pedicels of the spikelets enlarged at the summit into a shallow cupped receptacle; glumes about equal, acuminate, the first 5- to 7-nerved; sterile lemma and fertile lemma and palea hyaline, the fertile lemma awnless.

Tough perennial grasses with long rather stout rhizomes, flat blades narrowed to a petiole-like base, and narrow silky inflorescences.

1. *IMPERATA CONTRACTA* (H.B.K.) Hitchc. Rep. Mo. Bot. Gard. 4:146. 1893.

*Saccharum contractum* H.B.K. Nov. Gen. & Sp. 1:182. 1816.



*Saccharum caudatum* G. Meyer, Prim. Fl. Esseq. 68. 1818.

*Anatherum caudatum* Schult. Mant. 2:445. 1824.

*Anatherum portoricense* Spreng. Syst. Veg. 1:290. 1825.

*Imperata caudata* Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2:331. 1832.

Strongly rhizomatous perennial; culms erect, solitary or few together, 1–1.5 m. high; sheaths much longer than the internodes, rounded or keeled toward the summit, glabrous, the lower ones bladeless; ligule brown, not more than 0.5 mm. long; blades elongate, attenuate, usually some of them narrowed to a long petiole-like base, narrower than the mouth of the sheath, 5–10 mm. wide, the margins very scabrous; panicles mostly 30–40 cm. long, narrowed-attenuate toward the summit, the upper branches short and appressed, the lower ones slender, ascending to spreading, somewhat curved or flexuous, commonly 5–10 cm. long; spikelets 3 mm. long, obscured by the long silky hairs on the glumes and callus.

Hierba guayacán.

Grassy hills, banks, and fields, Mexico and the West Indies to Brazil and Peru.

BOCAS DEL TORO: Shepherd Island, *von Wedel* 2715. CHIRIQUÍ: David, *Hitchcock* 8357. CANAL ZONE: Toro Point, *Hitchcock* 8049; Fort Sherman, *Standley* 31229; Frijoles, *Killip* 4293; *Standley* 27644; Tabernilla, *Hitchcock* 8386; Culebra, *Hitchcock* 7934; Summit, *D. H. Popenoe* 20; between Miraflores and Pedro Miguel, *Pittier* 3966; Balboa, *Standley* 25633.

## 71. SACCHARUM L.

SACCHARUM L. Sp. Pl. 54. 1753.

Spikelets all alike, in pairs, one sessile, the other pedicellate, surrounded at the base by long silky hairs, the rachis readily disarticulating below the spikelets; glumes rather firm, 1- to 3-nerved, acute or acuminate; sterile lemma similar to the glumes but hyaline, the fertile lemma shorter than the glumes, hyaline, awnless, sometimes wanting.

Tall, coarse perennial grasses with large plume-like inflorescences of paniced racemes.

### 1. SACCHARUM OFFICINARUM L. Sp. Pl. 54. 1753.

Perennial; culms erect or ascending, as much as 4 m. high, glabrous, the lower internodes short; sheaths overlapping, rounded, glabrous, or softly pubescent toward the summit, densely villous in the throat, the lower ones readily falling away from the culm; ligule firm, dark brown, truncate, minutely ciliate, about 5 mm. long; blades elongate, broad, with prominent midnerve, sharply serrate, densely pubescent or villous on the upper surface at the base; panicles very large, dense, plumy, silvery or pinkish, the long branches drooping; spikelets 4–5 mm. long.

Sugarcane; Caña de azúcar.

Cultivated throughout tropical regions.

CANAL ZONE: Frijoles, *Hitchcock* 8390; Balboa, *Standley* 25640.



## 72. ERIOCHRYSIS Beauv.

ERIOCHRYSIS Beauv. Ess. Agrost. 8. *pl.* 4. *f.* 11. 1812.

Spikelets in pairs, the sessile spikelets perfect, the pedicellate somewhat smaller, pistillate, the rachis finally disarticulating below the spikelets; glumes equal, indurate, densely covered on the margins and on the back toward the summit with golden-brown silky hairs; fertile lemma awnless.

Tufted perennial grasses with short racemes arranged in a very dense, lobed, brown, silky inflorescence.

1. ERIOCHRYSIS CAYENNENSIS Beauv. Ess. Agrost. 8. *pl.* 4. *f.* 11. 1812.

*Saccharum cayennense* Benth. Jour. Linn. Soc. Bot. 19:66. 1881.

Coarse, densely tufted perennial; culms erect, commonly 1.5–2 m. high, the nodes bearded, otherwise glabrous; sheaths densely and softly villous, especially toward the summit, less so below, elongate, overlapping, or sometimes, especially the upper bladeless sheaths, shorter than the internodes; ligule 12 mm. long, thin, white, truncate; blades villous like the sheaths, 15–40 cm. long, 5–12 mm. wide, flat or folded, firm; panicles golden-brown, very dense and spike-like, interrupted below, 8–20 cm. long, 2–3 cm. wide, the branches short, appressed, densely villous in the axils with long hairs; spikelets 2.5–3 mm. long, the first glume glabrous on the back, the tip and margins fringed with brown silky hairs.

Marshes and bogs or sometimes grassy hills, southern Mexico and the West Indies to Uruguay.

CHIRIQUÍ: El Boquete, *Hitchcock* 8265, 8319; *Woodson & Schery* 741; valley of Río Caldera, near El Boquete, *Killip* 4580.

## 73. POLYTRIAS Hack.

POLYTRIAS Hack. in DC. Monogr. Phan. 6:189. *pl.* 1. *f.* 13. 1889.

Spikelets all perfect, in threes at the nodes of a slender disarticulating rachis, two sessile, placed back to back, the other pedicellate; first glume membranaceous, obtuse, densely hairy; sterile lemma wanting; fertile lemma hyaline, awned at the apex, the awn geniculate, twisted.

Low slender perennials with short narrow blades, and short, solitary, golden- or reddish-brown racemes.

1. POLYTRIAS PRAEMORSA (Nees) Hack. in DC. Monogr. Phan. 6:189. 1889.

*Pollinia praemorsa* Nees, Jour. Bot. Kew Misc. 2:98. 1850.

*Andropogon amaurus* Buse ex Miquel, Pl. Jungh. 360. 1854.

*Andropogon diversiflorus* Steud. Syn. Pl. Glum. 1:370. 1854.

*Polytrias amaura* Kuntze, Rev. Gen. Pl. 2:788. 1891.

*Polytrias diversiflora* Nash, Torreya 5:110. 1905.

Stoloniferous perennial; culms slender, decumbent-spreading, the ascending ends rising to a height of 15–30 cm., glabrous, or the lower nodes appressed-pubescent; sheaths glabrous to pilose, keeled, the lower longer, the upper usually



much shorter than the internodes; ligule a ciliate membrane about 0.5 mm. long; blades 2–6 cm. long, 1–3 mm. wide, flat, acuminate, papillose-pilose on both surfaces, the margins scabrous; raceme 2.5–5.5 cm. long, golden- or reddish-brown; spikelets 3 mm. long, the awn 7–8 mm. long, geniculate, tightly twisted below the bend, loosely twisted above.

Introduced in America in Panama, Cuba, Puerto Rico, Trinidad, and Venezuela. A native of the Philippines and Java. Cultivated as a lawn grass.

Java grass.

CANAL ZONE: Barro Colorado Island, *Standley 41124*; Summit, *Standley 30140*.

#### 74. ANDROPOGON L.

ANDROPOGON L. Sp. Pl. 1045. 1753.

*Schizachyrium* Nees, Agrost. Bras. 331. 1829.

*Bothriochloa* Kuntze, Rev. Gen. Pl. 2:767. 1891.

*Amphilophis* Nash in Britton, Man. 71. 1901.

Spikelets arranged in pairs at each node of a disarticulating rachis, one sessile and perfect, the other pedicellate and staminate, neuter, or sterile, often very much reduced, the rachis and sterile pedicels sparsely to usually densely ciliate or villous; glumes of sessile spikelet indurate, the first flat or rounded on the back, several-nerved, the median nerve obscure or wanting, the margins keeled toward the summit; sterile lemma hyaline; fertile lemma hyaline, narrow, much shorter than the glumes, awnless or usually awned from the apex or from between minute lobes, the awns straight, or geniculate and twisted below; pedicellate spikelets as large as the sessile, or more or less reduced, sometimes only the pedicel present, the glumes not indurate.

Annuals or perennials with solid culms, the spikelets arranged in racemes, these sessile and crowded on a common axis, paniculate, or usually solitary or paired, sometimes in 3's or 5's, the common peduncle enclosed or exerted from a spathe-like sheath, these sheaths aggregate in a loose or dense, often silky, compound inflorescence.

- a. Racemes solitary on each peduncle.
  - b. Plants annual; culms slender, widely spreading..... 1. *A. BREVIFOLIUS*
- bb. Plants perennial; culms coarser, erect, densely cespitose.
  - c. Spikelets awnless; racemes 1 cm. long, nearly glabrous; inflorescence dense..... 5. *A. VIRGATUS*
  - cc. Spikelets awned; racemes 2–8 cm. long; inflorescences loose, the racemes scattered, or if dense, plume-like.
    - d. Racemes very flexuous, conspicuously villous, crowded in a dense plume-like inflorescence..... 6. *A. CONDENSATUS*
  - dd. Racemes straight, not conspicuously villous, the spikelets appressed.
    - e. First glume of sessile spikelet usually densely villous..... 2. *A. HIRTIFLORUS*
  - ee. First glume of sessile spikelet glabrous.
    - f. Rachis joints 4–5 mm. long; spikelets not crowded, the sessile one commonly 5–6 mm. long; blades 2–5 mm. wide... 3. *A. SEMIBERBIS*
    - ff. Rachis joints 2–3 mm. long; spikelets rather crowded, the sessile one about 4 mm. long; blades usually not more than 1.5 mm. wide..... 4. *A. TENER*



- aa. Racemes 2 or more, digitate, paniculate, or crowded along a common axis.
- b. Racemes numerous, sessile, crowded along a common axis in a dense, white, or silvery inflorescence. Culms erect..... 14. *A. SACCHAROIDES*
- bb. Racemes few to several, paniculate, the panicles terminal on the main culm and short branches. Culms decumbent or straggling, rooting at the nodes..... 13. *A. CONDYLOTRICHUS*
- bbb. Racemes 2-5, sessile, paired or digitate at the ends of the peduncles.
- c. Spikelets awnless.
- d. Plants slender, usually less than 1 m. high; spathes not aggregate.
- e. Ligule 1-2 mm. long; tips of blades acute, not boat-shaped; spikelets 3 mm. long..... 10. *A. LEUCOSTACHYUS*
- ee. Ligule less than 1 mm. long; tips of blades boat-shaped; spikelets about 4 mm. long..... 11. *A. SELLOANUS*
- dd. Plants robust, 1-2.5 m. high; spathes aggregate in a usually dense inflorescence..... 7. *A. BICORNIS*
- cc. Spikelets awned.
- d. Awns geniculate, twisted below; spikelets of the lower pairs alike; second glume with a slender divergent awn..... 12. *A. ANGUSTATUS*
- dd. Awns slender, straight; spikelets of the lower pairs unlike.
- e. Racemes aggregate in a dense compound inflorescence, the spathes inconspicuous, rarely equaling the racemes; ultimate branchlets densely villous below the spathes..... 8. *A. GLOMERATUS*
- ee. Racemes scattered in a long loose inflorescence, the spathes conspicuous, exceeding the racemes; ultimate branchlets glabrous or nearly so below the spathes..... 9. *A. VIRGINICUS*

1. *ANDROPOGON BREVIFOLIUS* Swartz, Prodr. Veg. Ind. Occ. 26. 1788.

*Andropogon obtusifolius* Poir. in Lam. Encycl. Suppl. 1:583. 1810.

*Pollinia brevifolia* Spreng. Pl. Pugill. 2:13. 1815.

*Schizachyrium brevifolium* Nees ex Kunth, Enum. Pl. 1:488. 1833.

*Sorghum brevifolium* Kuntze, Rev. Gen. Pl. 2:791. 1891.

Slender annual; culms 15 cm. to nearly 1 m. long, forming loose tangles or dense mats, ascending from a decumbent base or trailing, freely branching, glabrous; sheaths usually much shorter than the internodes, compressed, keeled, glabrous; ligule membranaceous, about 0.5 mm. long; blades oblong, obtuse, navicular, 1-4 cm. long, 1-5 mm. wide, glabrous, the margins scaberulous, minutely ciliate at the base; flowering branches slender, numerous, from the middle and upper nodes; racemes solitary, delicate, 1-2 cm. long, partly included in the spathe, the rachis and sterile pedicel glabrous; sessile spikelet 2.5-3 mm. long, the callus bearded, otherwise glabrous, the slender awn about 8 mm. long, geniculate, tightly twisted below the bend; pedicellate spikelet reduced to a minute slender-awned rudiment.

Savannas, moist banks, and brushy slopes, southern Mexico and the West Indies to Bolivia and Brazil; tropical regions of both hemispheres.

COCLÉ: Aguadulce, Pittier 4868, 5054. CANAL ZONE: Mount Hope Cemetery, Standley 28794; Gamboa, Standley 28362; Culebra, Hitchcock 7953, 9169; Summit, D. H. Popenoe 24; Corozal, Standley 27395; Balboa, Standley 26446. PANAMÁ: Sabana of Panamá, Pittier 2545; Orange River, Killip 4257; Hacienda La Joya, Dodge, Hunter, Steyermark & Allen 16880; Río Tecúmen, Standley 26633.

2. *ANDROPOGON HIRTIFLORUS* (Nees) Kunth, Rév. Gram. 1: Suppl. XXXIX. 1830.



*Streptachne domingensis* Spreng. ex Schult. Mant. 2:188. 1824. Not *Andropogon domingensis* Steud., 1821.

*Schizachyrium hirtiflorum* Nees, Agrost. Bras. 334. 1829.

*Aristida? domingensis* Kunth, Rév. Gram. 1:62. 1829.

*Andropogon oligostachyus* Chapm. Fl. South. U. S. 581. 1860.

*Andropogon hirtiflorus* var. *oligostachyus* Hack. in DC. Monogr. Phan. 6:372. 1889.

*Sorghum hirtiflorum* Kuntze, Rev. Gen. Pl. 2:792. 1891.

*Schizachyrium oligostachyum* Nash in Small, Fl. Southeast. U. S. 59. 1903.

*Schizachyrium domingense* Nash, N. Amer. Fl. 17:103. 1912.

*Andropogon domingensis* F. T. Hubb. Proc. Amer. Acad. 49:493. 1913.

Perennial; culms tufted, erect, 0.4–1.5 m., commonly about 1 m. high, glabrous; sheaths shorter than the internodes, or the lower ones overlapping, glabrous, keeled, at least toward the summit; ligule 1–1.5 mm. long, brownish; blades 10–20 cm. long, 2–4 mm. wide, or on robust plants as much as 30 cm. long and 8 mm. wide, scaberulous, the margins scabrous; racemes mostly 4–8 cm. long, few to numerous, scattered on the flowering branches from the upper nodes, forming a loose inflorescence; rachis and sterile pedicels densely villous all over or only on the sides; sessile spikelet 5–6 mm. long, sparsely to densely villous, the middle of the back sometimes glabrous, the awn about 1 cm. long, geniculate, tightly twisted below the bend, loosely twisted above; pedicellate spikelet reduced to a small scabrous, short-awned rudiment.

An extremely variable species in size, habit, and pubescence of the racemes.

Savannas and grassy hills, southern United States and the West Indies to Paraguay and Peru.

CHIRIQUÍ: El Boquete, *Hitchcock* 8237, 8238, 8239; *Killip* 4545. PANAMÁ: Río Azote Caballo, *Dodge*, *Steyermark* & *Allen* 16861.

3. ANDROPOGON SEMIBERBIS (Nees) Kunth, Rév. Gram. 1: Suppl. XXXIX. 1830. *Schizachyrium semiberbe* Nees, Agrost. Bras. 336. 1829.

Very similar to *A. hirtiflorus*, differing primarily in the glabrous or scabrous first glume of the sessile spikelet, and the glabrous or only sparsely hairy rachis and sterile pedicels, the hairs confined to the margins near the summit; culms stouter, on the average, the blades rarely less than 4 mm. long.

Savannas and dry or rocky hills and cliffs, Florida, eastern Mexico, and the West Indies to Ecuador and Argentina.

CANAL ZONE: between Panamá and Corozal, *Hitchcock* 9187; Ancón Hill, *Standley* 26356. PANAMÁ: Las Sabanas, *Standley* 40776; Chorrera, *Hitchcock* 8146; Taboga Island, *Hitchcock* 8086, 8091; *Killip* 4145.

*Hitchcock* 9187 and *Standley* 26356 differ from typical specimens in having more slender racemes and sessile spikelets scarcely more than 4 mm. long, but the plants are coarse with broad blades as in *A. semiberbe*.

4. ANDROPOGON TENER (Nees) Kunth, Rév. Gram. 1: Suppl. XXXIX. 1830.

*Schizachyrium tenerum* Nees, Agrost. Bras. 336. 1829.

*Andropogon gracilis* Presl, Rel. Haenk. 1:336. 1830. Not *A. gracilis* Spreng., 1825.

*Andropogon preslii* Kunth, Rév. Gram. 1: Suppl. XXXIX. 1830.

*Andropogon leptophyllus* Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2:264. 1832.



*Sorghum tenerum* Kuntze, Rev. Gen. Pl. 2:792. 1891.

Densely tufted perennial; culms usually very slender, erect or reclining, 30–100 cm. long, glabrous; sheaths narrow, keeled, glabrous, the lower longer, the upper shorter than the internodes; ligule about 0.2 mm. long; blades commonly 5–10 cm. long, 1–3 mm. wide, flat or conduplicate, sometimes subinvolute, more or less curved or flexuous, sparsely papillose-hirsute near the base; flowering branches rather few and distant, slender, some of the racemes exerted on long slender peduncles; racemes slender but straight, 2–5 cm. long, the rachis and sterile pedicels with a few long hairs on the sides near the summit, otherwise glabrous; sessile spikelet 4 mm. long, acute or acuminate, scabrous at least toward the tip, the callus rather densely bearded, the awn 7–12 mm. long, geniculate, tightly twisted below the bend; pedicellate spikelet as large as the sessile one, awnless.

Savannas, grassy hills and open slopes, southeastern United States and the West Indies to Argentina.

CHIRIQUÍ: El Boquete, *Hitchcock* 8175, 8246; Cerro Vaca, *Pittier* 5361. COCLÉ: Olá, *Pittier* (s. n.).

*Hitchcock* 8175 and *Pittier* 5361 have spikelets 5–6 mm. long, but the plants are slender and the spikelets are crowded as in *A. tener*.

5. ANDROPOGON VIRGATUS Desv. ex Hamilt. Prodr. Pl. Ind. Occ. 9. 1825.

*Hypogynium spathiflorum* Nees, Agrost. Bras. 366. 1829.

*Andropogon spathiflorus* Kunth, Rév. Gram. 1: Suppl. XL. 1830.

Perennial; culms relatively slender, tufted, commonly 1–1.5 m. high, occasionally only 0.5 m., erect, glabrous, usually tinged dull red or brownish; sheaths usually much shorter than the long internodes, compressed, keeled, glabrous; ligule membranaceous, 0.5 mm. long; blades elongate, especially those of the innovations, 2–5 mm. wide, conduplicate, becoming flat, the lower surface glabrous, the upper often more or less villous, the margins obscurely scabrous, sometimes ciliate near the base; inflorescence long and narrow, the slender, relatively short branches closely appressed, bearing numerous solitary racemes 1 cm. long, partly enclosed in small reddish or purplish spathes; spikelets green, 3 mm. long, awnless, the pedicellate as large as the sessile one; first glume scabrous on the keels.

Wet savannas, the West Indies and Costa Rica to Brazil.

CHIRIQUÍ: Dolega, *Hitchcock* 8337.

6. ANDROPOGON CONDENSATUS H.B.K. Nov. Gen. & Sp. 1:188. 1816.

*Andropogon microstachyus* Desv. ex Hamilt. Prodr. Pl. Ind. Occ. 8. 1825.

*Cymbopogon condensatus* Spreng. Syst. Veg. 1:289. 1825.

*Schizachyrium condensatum* Nees, Agrost. Bras. 333. 1829.

*Pollinia microstachya* Desv. Opusc. 70. 1831.

*Andropogon benthamianus* Steud. Syn. Pl. Glum. 1:382. 1854.

Rather coarse perennial; culms 1–1.5 m. high, erect, glabrous; sheaths mostly shorter than the internodes, sometimes overlapping, strongly compressed, keeled, glabrous or scaberulous; ligule firm, truncate, about 2 mm. long; blades 10–20



cm., or even 25 cm., long, 5–10 mm. wide, conduplicate or becoming flat, glabrous, the margins scaberulous; flowering branches numerous from the upper sheaths, ascending or appressed, forming a large, dense, feathery, corymbose, compound inflorescence; racemes solitary, 2–3 cm. long, partly included in the short inconspicuous spathes, the rachis strongly flexuous, the rachis and sterile pedicels long-villous on the sides; sessile spikelet 4 mm. long, narrow, acuminate, the callus shortly bearded, the delicate awn 8–12 mm. long, geniculate, tightly twisted below the bend, loosely twisted above; pedicellate spikelet rudimentary, awnless, or with a short thread-like awn.

Rabo de venado.

Dry open ground and brushy slopes, Mexico and the West Indies to Argentina.

CHIRIQUÍ: El Boquete, *Hitchcock* 8185; *Killip* 4509. COCLÉ: El Valle, *Allen* 769. CANAL ZONE: Fort Randolph, *Standley* 28711; Toro Point, *Hitchcock* 8056; Fort Lorenzo, *Piper* 5947; between France Field, Canal Zone, and Catival, Colón, *Standley* 30421; Gatún, *Hitchcock* 7970; Barro Colorado Island, *Standley* 4114; Darién Station, *Standley* 31570; Corozal, *Standley* 27380; Ancón Hill, *Killip* 4014, 4219; *Piper* 5265, 5287; *Bro. Celestine* 81; Balboa, *Standley* 26096. PANAMÁ: Panamá, *Standley* 26804; Taboga Island, *Allen* 112.

7. ANDROPOGON BICORNIS L. Sp. Pl. 1046. 1753.

*Anatherum bicornis* Beauv. Ess. Agrost. 128. 1812.

*Saccharum bicornis* Griseb. Abh. Ges. Wiss. Göttingen 7:266. 1857.

*Sorghum bicornis* Kuntze, Rev. Gen. Pl. 2:791. 1891.

Coarse perennial; culms 1–2.5 m. high, erect, in rather large clumps, glabrous; sheaths usually shorter than the internodes or the lower ones overlapping, broad, loose, keeled toward the summit, glabrous; ligule 1–1.5 mm. long, minutely erose-ciliate; blades elongate, 2–5 mm. wide, the lower surface glabrous or the midnerve scabrous, the upper pubescent, the margins very scabrous, especially near the tip; flowering branches numerous from the upper sheaths, very compound, forming a very dense, corymbose feathery inflorescence; racemes paired, 2–3 cm. long, partly enclosed or exerted on long slender peduncles from the narrow inconspicuous spathes, the rachis and sterile pedicels densely hairy, the hairs spreading, as much as 5 mm. long; sessile spikelet 3 mm. long, awnless, glabrous; pedicellate spikelet rudimentary, or occasionally larger than the sessile one.

Savannas, fields and open hillsides, sometimes in swamps, southern Mexico and the West Indies to Bolivia and Argentina.

Rabo de Chibo.

BOCAS DEL TORO: Water Valley, *von Wedel* 1617. CHIRIQUÍ: El Boquete, *Hitchcock* 8182, 8240, 8258; *Maxon* 5209; *Davidson* 699; *Woodson & Schery* 708. COCLÉ: between Las Margaritas and El Valle, *Woodson, Allen & Seibert* 1714. CANAL ZONE: Toro Point, *Hitchcock* 8050; Gatún, *Hitchcock* 7982; Monte Lirio, *Maxon* 6865; Bohio, *Maxon* 4769; Frijoles, *Piper* 5223; Barro Colorado Island, *Bailey & Bailey* 386; *Kenoyer* 108; Gamboa, *Standley* 28469; Empire to Mandinga, *Piper* 5238, 5250; Culebra, *Hitchcock* 7938; Miraflores, *Greenman & Greenman* 5199; between Miraflores and Pedro Miguel, *Pittier* 3967; Ancón Hill, *Killip* 4019, 12088; Balboa, *Standley* 25666. PANAMÁ: Río Pescada, *Bartlett & Lasser* 16607; Chorrera, *Hitchcock* 8131; Río Tapia, *Standley* 28068; Río Tecúmen, *Standley* 26643; Taboga Island, *Hitchcock* 8084.



8. *ANDROPOGON GLOMERATUS* (Walt.) B.S.P. Prel. Cat. N. Y. 67. 1888.  
*Cinna glomerata* Walt. Fl. Carol. 59. 1788.  
*Andropogon macrourus* Michx. Fl. Bor. Amer. 1:56. 1803.  
*Anatherum macrourum* Griseb. Mem. Amer. Acad. (n. s.) 8:534. 1863.  
*Andropogon macrourus* var. *abbreviatus* Hack. in DC. Monogr. Phan. 6:408. 1889.  
*Andropogon macrourus* var. *corymbosus* Chapm. ex Hack. in DC. Monogr. Phan. 6:409. 1889.  
*Sorghum glomeratum* Kuntze, Rev. Gen. Pl. 2:790. 1891.  
*Andropogon virginicus* var. *corymbosus* Beal, Grasses N. Amer. 2:52. 1896.  
*Andropogon glomeratus* var. *corymbosus* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 7 (ed. 3):15. 1900.  
*Andropogon glomeratus* var. *abbreviatus* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 7 (ed. 3):15. 1900.  
*Andropogon corymbosus* Nash in Britton, Man. 69. 1901.  
*Andropogon corymbosus abbreviatus* Nash in Britton, Man. 70. 1901.  
*Andropogon glomeratus tenuispatheus* Nash in Small, Fl. Southeast. U. S. 61. 1903.  
*Andropogon tenuispatheus* Nash, N. Amer. Fl. 17:113. 1912.

Similar in habit and aspect to *A. bicornis*; sheaths sometimes appressed-hirsute on the margins and toward the summit; ultimate branchlets densely hairy below the spathes; sessile spikelet 3-4 mm. long, awned, the awn slender, straight, about 1.5 cm. long; pedicellate spikelet very greatly reduced or usually wanting; the pedicel only present.

Open ground, fields, and grassy banks, often in wet places, southeastern United States and the West Indies to Panama.

CHIRIQUÍ: El Boquete, *Hitchcock* 8284, 8289; Bajo Boquete, *Killip* 4567. CANAL ZONE: Toro Point, *Hitchcock* 8038; Fort Sherman, *Standley* 31228; Colón, *Hitchcock* 8033; Barro Colorado Island, *Kenoyer* 262; Culebra, *Hitchcock* 7937; Balboa, *Standley* 25629.

9. *ANDROPOGON VIRGINICUS* L. Sp. Pl. 1046. 1753.  
*Cinna lateralis* Walt. Fl. Carol. 59. 1788.  
*Andropogon dissitiflorus* Michx. Fl. Bor. Amer. 1:57. 1803.  
*Anatherum virginicum* Spreng. Pl. Pugill. 2:16. 1815.  
*Andropogon vaginatus* Ell. Bot. S. C. & Ga. 1:148. 1816.  
*Andropogon tetrastachyus* Ell. Bot. S. C. & Ga. 1:150. pl. 8. f. 4. 1816.  
*Andropogon eriophorus* Scheele, Flora 27:51. 1844. Not *A. eriophorus* Willd., 1806.  
*Andropogon louisianae* Steud. Syn. Pl. Glum. 1:383. 1854.  
*Andropogon curtisianus* Steud. Syn. Pl. Glum. 1:390. 1854.  
*Andropogon virginicus* var. *vaginatus* Wood, Class-book. ed. 3. 808. 1861.  
*Andropogon virginicus* var. *viridis* Hack. in DC. Monogr. Phan. 6:410. 1889.  
*Andropogon virginicus* var. *tetrastachyus* Hack. in DC. Monogr. Phan. 6:411. 1889.  
*Sorghum virginicum* Kuntze, Rev. Gen. Pl. 2:792. 1891.

Densely tufted perennial; culms erect, 1-1.5 m. high, glabrous; lower leaves crowded in a dense basal cluster, the sheaths flattened, keeled, glabrous, or somewhat hirsute at the summit, the blades elongate, 2-4 mm. wide, the upper surface scabrous, more or less villous toward the base; culm sheaths much shorter than the internodes; ligule about 0.5 mm. long, minutely ciliate; flowering branches from the middle and upper nodes forming a loose inflorescence nearly half the length of the culms; racemes paired, slender, flexuous, partly enclosed in the broad conspicuous spathes, the rachis and sterile pedicels villous with long slender white



hairs; sessile spikelet 3–4 mm. long, bearing a straight slender awn 10–15 mm. long; first glume acuminate, scabrous on the keels near the summit.

Open ground, savannas, hillsides and swamps, southern United States and the West Indies to Panama.

CANAL ZONE: Gatún, *Hitchcock* 7971, 7972; Balboa, *Hitchcock* 8013. PANAMÁ: Chorrera, *Hitchcock* 8143.

10. *ANDROPOGON LEUCOSTACHYUS* H.B.K. Nov. Gen. & Sp. 1:187. 1816.

*Andropogon lanuginosus* H.B.K. Nov. Gen. & Sp. 1:187. 1816.

*Anatherum domingense* Roem. & Schult. Syst. Veg. 2:809. 1817.

*Andropogon domingensis* Steud. Nom. Bot. 45. 1821.

*Andropogon leucostachyus* subvar. *subvillosus* Hack. in DC. Monogr. Phan. 6:420. 1889.

*Sorghum leucostachyum* Kuntze, Rev. Gen. Pl. 2:792. 1891.

Slender perennial; culms in small dense tufts, erect, 25–70 cm. high, glabrous; sheaths narrow, compressed, glabrous, the lower ones crowded; ligule 1–2 mm. long, thin, truncate, minutely erose; blades 5–15 cm. long, or those on the innovations as much as 35 cm. long, 1–3 mm. wide, acute, scaberulous; flowering branches few, long and slender, sparingly branched; racemes paired, sometimes 3, exerted on long slender peduncles, the spathes rather long, but very narrow and inconspicuous; rachis and sterile pedicels slender but straight, densely villous, the spreading hairs commonly 10 mm. long; sessile spikelet 3 mm. long, glabrous, awnless; pedicellate spikelet wanting.

Open, usually dry, fields and hillsides, Mexico and the West Indies to Argentina.

CHIRIQUÍ: El Boquete, *Hitchcock* 8240½; *Pittier* 3324; Bajo Boquete, *Killip* 4578; David, *Hitchcock* 8363, 8364; Cerro Vaca, *Pittier* 5348. CANAL ZONE: between France Field, Canal Zone, and Catival, Colón, *Standley* 30428; Monte Lirio, *Maxon* 6864; Frijoles, *Standley* 31497; Empire to Mandinga, *Piper* 5279; Culebra, *Hitchcock* 7936; Summit, *Standley* 30118; between Pedro Miguel and Corozal, *Hitchcock* 7989; Corozal, *Killip* 4094; *Standley* 27402; Ancón Hill, *Killip* 4013, 4218, 12108; Balboa, *Standley* 25652. PANAMÁ: Juan Díaz, *Allen* 928; Chorrera, *Hitchcock* 8145; Río Tecúmen, *Standley* 26522.

11. *ANDROPOGON SELLOANUS* (Hack.) Hack. Bull. Herb. Boiss. II. 4:266. 1904.

*Andropogon leucostachyus* subsp. *selloanus* Hack. in DC. Monogr. Phan. 6:420. 1889.

Densely tufted perennial resembling *A. leucostachyus*; culms erect, 45–100 cm. high, solitary or few in each tuft, glabrous; sheaths compressed, keeled, glabrous; ligule 0.5 mm. long; blades conduplicate, becoming flat, 3–5 mm. wide, those of the culm 5–8 cm. long, the uppermost much reduced or wanting, those of the innovations sometimes as much as 20 cm. long; flowering branches long and slender, solitary from the middle and upper sheaths, unbranched; racemes 3–5, exerted from the long and narrow but inconspicuous spathes, densely villous with tawny hairs more than 10 mm. long; sessile spikelet 3–4 mm. long, awnless, glabrous; pedicellate spikelet wanting.

Dry open or wooded hills and banks, British Honduras and the West Indies to Paraguay.

CHIRIQUÍ: David, *Hitchcock* 8366. PANAMÁ: Chorrera, *Hitchcock* 8154.



12. *ANDROPOGON ANGUSTATUS* (Presl) Steud. Syn. Pl. Glum. 1:370. 1854.*Diectomis laxa* Nees, Agrost. Bras. 340. 1829. Not *Andropogon laxus* Willd., 1806.*Diectomis angustata* Presl, Rel. Haenk. 1:333. 1830.*Andropogon apricus* Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 2<sup>1</sup>:83. 1836.

Erect slender perennial; culms 50–120 cm. high, glabrous; sheaths much shorter to longer than the internodes, compressed, keeled, auriculate, glabrous; ligule firm, 1–2 mm. long, fused with the auriculate summit of the sheath; blades linear, attenuate, 2–3 mm. wide, glabrous beneath, scabrous above and on the margins; flowering branches few to several from the upper sheaths, forming a loose inflorescence; racemes paired, rarely solitary, about 3 cm. long, at first partly included, finally exerted on long, slender, somewhat flexuous peduncles 5–10 cm. long; rachis and sterile pedicels thickened above, stiffly ciliate with white hairs; sessile spikelet 6 mm. long, the callus densely bearded with white hairs; first glume narrow, obtuse, deeply sulcate, glabrous; second glume compressed, keeled, with a slender divergent awn about 1 cm. long; awn of fertile lemma 3–4 cm. long, rather stout, brown, hispidulous, twice-geniculate, the lower segments tightly twisted, the upper straight; pedicellate spikelet 5 mm. long, the first glume not sulcate, long-hairy on the margins, with a straight slender awn 2–6 mm. long.

Dry savannas at low altitudes, Cuba; Mexico to Brazil.

PANAMÁ: Aguadulce, *Pittier 4883*. CANAL ZONE: Corozal, *Killip 4246*; between Fort Clayton and Corozal, *Standley 29157*; between Panamá and Corozal, *Hitchcock 9190*. PANAMÁ: between Matías Hernández and Juan Díaz, *Standley 32080*; Juan Díaz, *Killip 4225*; Río Tecúmen, *Standley 29392*.

13. *ANDROPOGON CONDYLOTRICHUS* Hochst. ex Steud. Syn. Pl. Glum. 1:377. 1854.*Andropogon piptatherus* Hack. in Mart. Fl. Bras. 2<sup>3</sup>:293. 1883.*Sorghum piptatherum* Kuntze, Rev. Gen. Pl. 2:792. 1891.*Amphilobis piptatherus* Nash, N. Amer. Fl. 17:127. 1912.*Euclasta condylotricha* Stapf in Prain, Fl. Trop. Afr. 9:181. 1917.

Annual; culms commonly 1–2 m. long, decumbent or straggling, rooting at the nodes, sending up numerous weak branches, the nodes densely bearded, otherwise glabrous; sheaths usually shorter than the internodes, keeled toward the summit, glabrous on the back, villous in the throat and on the collar; ligule 1 mm. long, membranaceous, with a line of stiff hairs behind it; blades 15–20 cm. long, 4–8 mm. wide, flat, acuminate, sparsely papillose, the margins scabrous; racemes 2–5 cm. long, paniculate, the panicles terminal on the main culm and short branches from the upper sheaths, the panicle branches flexuous, densely villous in the axils; lower pairs of spikelets homogamous; fertile sessile spikelets 4 mm. long, the first glume densely villous, the awn 3–4 cm. long, 2-geniculate, the lower segments brown, tightly twisted, hispidulous, the terminal segment loosely twisted, scabrous; pedicellate spikelets 5–6 mm. long, sparsely papillose-pilose, the keels scabrous.

Brushy slopes, Mexico and the West Indies to Colombia and Venezuela. Also in tropical Africa.



CANAL ZONE: Balboa, *Standley 25264, 26423*.

14. *ANDROPOGON SACCHAROIDES* Swartz, Prodr. Veg. Ind. Occ. 26. 1788.

*Andropogon argenteus* DC. Cat. Hort. Monsp. 77. 1813.

*Andropogon laguroides* DC. Cat. Hort. Monsp. 78. 1813.

*Andropogon glaucus* Torr. Ann. Lyc. N. Y. 1:153. 1824. Not *A. glaucus* Retz., 1789.

*Trachypogon argenteus* Nees, Agrost. Bras. 348. 1829.

*Trachypogon laguroides* Nees, Agrost. Bras. 349. 1829.

*Andropogon torreyanus* Steud. Nom. Bot. ed. 2. 1:93. 1840.

*Andropogon saccharoides* var. *laguroides* Hack. in Mart. Fl. Bras. 2<sup>3</sup>:293. 1883.

*Andropogon saccharoides* var. *torreyanus* Hack. in DC. Monogr. Phan. 6:495. 1889.

*Sorghum saccharoides* Kuntze, Rev. Gen. Pl. 2:792. 1891.

*Andropogon saccharoides* var. *glaucus* Scribn. Mem. Torrey Club 5:28. 1894.

*Amphilophis torreyanus* Nash in Britton, Man. 71. 1901.

*Holcus saccharoides* Kuntze ex Stuck. Anal. Mus. Nac. Buenos Aires 11:48. 1904.

*Holcus saccharoides* var. *laguroides* Hack. ex Stuck. Anal. Mus. Nac. Buenos Aires 11:48. 1904.

*Amphilophis saccharoides* Nash, N. Amer. Fl. 17:125. 1912.

*Bothriochloa saccharoides* Rydb. Brittonia 1:81. 1931.

*Bothriochloa laguroides* Herter, Revist. Sudamer. Bot. 6:135. 1940; also Pilger in Engler & Prantl, Nat. Pflanzenfam. ed. 2. 14e:160. 1940.

Tufted perennial; culms erect, brittle, 0.5–2 m. high, the nodes usually glabrous but sometimes some of them densely pubescent, but scarcely bearded; sheaths rounded on the back, glabrous; blades flat, acuminate, 10–20 cm., or even 30 cm., long in robust plants, 2–8 mm. wide, scabrous, papillose-hirsute near the base; panicles 5–15 cm. long, dense, white-silky, the usually numerous branches appressed or narrowly ascending; sessile spikelet 4 mm. long, the geniculate twisted awn 1.5–2 cm. long; pedicellate spikelet as long as the sessile, but much narrower, awnless.

Fields, savannas, and grassy slopes, southwestern United States and the West Indies to Argentina.

CANAL ZONE: Balboa, *Hitchcock 8012*. PANAMÁ: Las Sabanas, *Standley 25902*; Chepo, *Killip 4175*.

75. *DIECTOMIS* H.B.K.

*DIECTOMIS* H.B.K. Nov. Gen. & Sp. 1:193. *pl. 64*. 1816.

Spikelets in pairs at the nodes of a readily disarticulating rachis, the rachis segments and pedicels narrow at the base, gradually widened and thickened to the summit, densely ciliate-villous on the margins; sessile spikelet laterally compressed, the first glume deeply sulcate, 2-keeled, awnless, the second glume with a slender somewhat divergent awn; fertile lemma shorter than the glumes, 3-nerved, awned from between 2 small teeth, the awn once-geniculate, much longer and stouter than those of the glumes; pedicellate spikelet prominent; first glume broad, flat, many-nerved, rather abruptly acute or acuminate, bearing a slender awn from between the slender teeth of the bifid apex; second glume much shorter and narrower, acuminate.

Erect, branching annuals with solitary racemes somewhat aggregate on the



branches from the upper nodes, forming a narrow but rather loose compound inflorescence.

1. *DIECTOMIS FASTIGIATA* (Swartz) H.B.K. Nov. Ger. & Sp. 1:193. *pl.* 64. 1816. *Andropogon fastigiatus* Swartz, Prodr. Veg. Ind. Occ. 26. 1788.

Slender annual; culms erect, commonly 0.5–1.5 m., sometimes as little as 15 cm. high, glabrous; sheaths rounded, glabrous, shorter than the internodes; ligule 5–10 mm., rarely 20 mm., long, acuminate; blades elongate, attenuate, flat or involute, 1–4 mm. wide, scabrous; flowering branches from the upper nodes, ascending, forming a narrow, compound but rather loose inflorescence, the ultimate branchlets somewhat flexuous; racemes 2–6 cm. long, partly enclosed in the spathes; sessile spikelet 5 mm. long, the divergent awn of the second glume about 10 mm. long, that of the fertile lemma 4–5 cm. long, once-geniculate, tightly twisted below the bend; pedicellate spikelet conspicuous, 8 mm. long, minutely ciliate on the margins, the awns 6–10 mm. long; second glume much narrower, 5 mm. long, acuminate.

Dry open ground and thickets, Mexico and the West Indies to Brazil.

CHIRIQUÍ: San Felix, *Pittier 5259*. COCLÉ: Aguadulce, *Pittier 4849, 4877, 4110*; between Paso del Arado and Olá, *Pittier 5018*. CANAL ZONE: between Fort Clayton and Corozal, *Standley 29157a*; between Panamá and Corozal, *Hitchcock 9189*; Ancón, *Hitchcock 22942*. PANAMÁ: between Las Sabanas and Matías Hernández, *Standley 31860*; Nuevo San Francisco, *Standley 30783*; Panamá, *Piper 5245*; *Standley 26805*; Taboga Island, *Standley 28019*.

#### 76. CYMBOPOGON Spreng.

CYMBOPOGON Spreng. Pl. Pugill. 2:14. 1815.

Spikelets in pairs at each node of the short, paired racemes, those of the lowest pair of one or both racemes alike, sterile, awnless, and similar to the pedicellate spikelets above; sessile fertile spikelets dorsally compressed; first glume flat or grooved, sharply 2-keeled; fertile lemma narrow, awned from between two short lobes, sometimes awnless.

Rather coarse perennials with long narrow blades and large, usually drooping, compound inflorescences of aggregate pairs of racemes subtended by spathes.

1. *CYMBOPOGON CITRATUS* (DC.) Stapf, Kew Bull. Misc. Inf. 1906:322. 1906.

Densely tufted perennial, seldom if ever flowering in American Tropics; culms erect in large clumps from short rhizomes, commonly 1–2 m. high with numerous leafy sterile shoots; sheaths crowded at the base, elongate, glabrous, the lower ones often of nearly equal length, auriculate, the auricles fused with the margins of the ligule; blades as much as 1 m. long, 5–15 mm. wide, attenuate to a fine point, gradually narrowed to a long almost petiole-like base, scabrous, especially on the margins, the midrib rather strong toward the base; inflorescence 30–60 cm. long, drooping.

Lemon grass; Te limón; Zacate limón.

Cultivated throughout tropical America; introduced from India or Ceylon.



Tea made from the leaves is used for colds, fevers, and various ailments. This plant is the source of part of the lemon-grass oil of commerce.

CANAL ZONE: between France Field, Canal Zone, and Catival, Colón, *Standley 30166*.

### 77. HYPARRHENIA Anderss.

HYPARRHENIA Anderss. ex Stapf in Prain, Fl. Trop. Afr. 9:291. 1919.

Spikelets arranged in pairs at the nodes of short paired racemes, each pair subtended by a spathe, the lowest pairs alike, awnless, similar to the pedicellate spikelets above; first glume of sessile fertile spikelet flat or rounded, not keeled, or keeled only near the summit; lemma small and narrow, sometimes minutely lobed, with a relatively strong geniculate awn; pedicellate spikelets about as large as the sessile, awnless.

Tall coarse perennials with long narrow blades and rather loose inflorescences, the pairs of racemes somewhat crowded on the branches.

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|--|-----------------|
| a. Racemes 1 cm. long, purple, with 1 fertile spikelet, the peduncle strongly curved or flexuous, densely papillose-hirsute.....                                 | 1. H. BRACTEATA |
| aa. Racemes 2-3 cm. long, reddish-brown, with more than one fertile spikelet, usually several, the peduncles straight or only slightly curved, short-pilose..... | 2. H. RUFA      |

#### 1. HYPARRHENIA BRACTEATA (Humb. & Bonpl.) Stapf in Prain, Fl. Trop. Afr. 9:360. 1919.

*Andropogon bracteatus* Humb. & Bonpl. ex Willd. Sp. Pl. 4:914. 1806.

*Cymbopogon bracteatus* Hitchc. Contr. U. S. Nat. Herb. 17:209. 1913.

Perennial; culms in large clumps, erect, 0.5-1.5 m., or sometimes 2 m., high, appressed-hirsute below the nodes; sheaths compressed, keeled, appressed-hirsute at least toward the summit, often densely hirsute all over, the lower ones elongate; ligule membranaceous, 1-2 mm. long; blades elongate, 2-4 mm. wide, flat, or loosely rolled in drying, glabrous or villous, with a bunch of long hairs just back of the ligule; inflorescence narrow and rather dense, usually crowded toward the summit of the culm, the branches usually short-appressed; racemes about 1 cm. long, with 1 perfect spikelet, purple, the pairs protruding from the side of the narrow, hirsute spathes, the peduncle curved or flexuous, densely papillose-hirsute; fertile spikelet 5 mm. long, minutely bi-dentate, sulcate, hispid on the margins at the summit; awns 15-20 mm. long, twice-geniculate, brown, the lower segments tightly twisted, hirsute with pale or yellow hairs; pedicellate spikelets as large as the sessile, the first glume acuminate or awn-pointed.

Fields, wet savannas, and grassy hills, Mexico to Paraguay.

CHIRIQUÍ: El Boquete, *Hitchcock 8173, 8295; Killip 4520*. COCLÉ: Picacho de Olá, *Pittier 5071*.

#### 2. HYPARRHENIA RUFA (Nees) Stapf in Prain, Fl. Trop. Afr. 9:304. 1919.

*Trachypogon rufus* Nees, Agrost. Bras. 345. 1829.

*Andropogon rufus* Kunth, Rév. Gram. 1: Suppl. XXXIX. 1830.

*Cymbopogon rufus* Rendle, Cat. Afr. Pl. Welw. 2:155. 1899.



Perennial; culms erect in large dense clumps 1–2.5 m. high, rarely less, glabrous; sheaths keeled toward the summit, glabrous or papillose-hirsute on the margins toward the summit and in the throat; ligule brown, membranaceous, 2–4 mm. long; blades linear, elongate, 2–8 mm. wide, glabrous or scaberulous, the margins sometimes scabrous; inflorescence 20–40 cm. long, loose and open, composed of several to numerous compound branches from the upper nodes; pairs of racemes terminating the ultimate branchlets, exerted from the narrow inconspicuous spathes, the peduncles commonly 4–6 cm. long, flexuous, pilose; racemes 2–3 cm. long, reddish-brown, the rachis and sterile pedicels densely ciliate with rufous or sometimes yellowish hairs; sessile spikelets 3–4 mm. long; first glume acute or subobtuse, sparsely to densely covered with red hairs; awns 15–20 mm. long, twice-geniculate, brown, the lower segments tightly twisted, hispidulous; pedicellate spikelet as large as the sessile, acute, awnless.

Cultivated as a forage grass, sometimes escaped, Guatemala to Venezuela and Brazil; Tropics of the Old World.

Jaraguá; Zacate jaraguá.

PANAMÁ: Chepo, *Hunter & Allen 80*.

#### 78. SORGHUM Moench

SORGHUM Moench, *Meth. Pl.* 207. 1794.

*Blumenbachia* Koel. *Descr. Gram.* 28. 1802.

Spikelets in pairs, one sessile and fertile, the other pedicellate, usually staminate, the pairs at the nodes of the tardily disarticulating rachis of short, few-jointed, paniced racemes, the terminal sessile spikelet with 2 pedicellate spikelets; glumes of fertile spikelet indurate, the first rounded, somewhat keeled at the summit; fertile lemma awnless or with a short, usually geniculate, twisted awn; pedicellate spikelets herbaceous, lanceolate, the first glume several-nerved, 2-keeled in the upper half.

Coarse annuals or perennials with long narrow or wide blades and open, often large, panicles of short racemes.

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|--|-----------------|
| a. Plants perennial with strong rhizomes; blades mostly 1–1.5 cm. wide | 1. S. HALEPENSE |
| aa. Plants annual; blades wider  | 2. S. VULGARE   |

1. SORGHUM HALEPENSE (L.) Pers. *Syn. Pl.* 1:101. 1805.

*Holcus halepensis* L. *Sp. Pl.* 1047. 1753.

*Blumenbachia halepensis* Koel. *Descr. Gram.* 29. 1802.

*Milium halepense* Cav. *Descr. Pl.* 306. 1802.

*Andropogon halepensis* Brot. *Fl. Lusit.* 1:89. 1804.

*Andropogon sorghum* subsp. *halepensis* Hack. in DC. *Monogr. Phan.* 6:501. 1889.

*Andropogon halepensis* var. *anatherus* Piper, *Proc. Biol. Soc. Washington* 28:28. 1915.

Perennial with numerous strong rhizomes; culms erect, usually 1–1.5 m. high, the nodes appressed-pubescent; sheaths usually shorter than the internodes, rounded, glabrous; ligule membranaceous, ciliate, about 2 mm. long; blades elongate, commonly 1–1.5 cm. wide, smooth on both surfaces, the margins somewhat sca-



brous, the midrib prominent; panicles 15–25 cm. long, the branches ascending or spreading, naked below; spikelets 5 mm. long, acute, rather easily and cleanly disarticulating from the pedicel, the first glume indurate, pubescent, the awn, when present, 7–10 mm. long, deciduous.

A common weed in fields and waste places, southeastern United States, Mexico, and the West Indies to Uruguay and Chile. Originally from the Mediterranean region.

Johnson grass.

CANAL ZONE: between Mindi and Colón, *Hitchcock* 7948; Summit, *Standley* 30128; Balboa, *Hitchcock* 8002.

2. *SORGHUM VULGARE* Pers. Syn. Pl. 1:101. 1805.

*Holcus sorghum* L. Sp. Pl. 1047. 1753.

*Andropogon sorghum* Brot. Fl. Lusit. 1:88. 1804.

*Andropogon vulgaris* Raspail, Ann. Sci. Nat. Bot. 5:307. 1825.

*Sorghum dura* Griseb. Fl. Brit. W. Ind. 560. 1864.

*Sorghum sorghum* Karst. Deutsch. Fl. 367. f. 189. 1880.

*Andropogon sorghum* var. *sativus* Hack. in DC. Monogr. Phan. 6:505. 1889.

*Andropogon sorghum* subsp. *sativus* var. *vulgaris* Hack. in DC. Monogr. Phan. 6:515. 1889.

*Andropogon sorghum* var. *vulgaris* Hack. ex Hook. f. Fl. Brit. Ind. 7:184. 1896.

Annual; culms coarse, erect, with broad flat blades and small to large, dense, heavy panicles; spikelets ovate, rather densely hairy, awned or awnless.

Cultivated for forage; sometimes escaped. An extremely variable species with numerous horticultural varieties.

Sorghum; Maicillo.

Warm regions of both hemispheres.

CANAL ZONE: Balboa, *Standley* 26467.

*SORGHUM VULGARE* var. *SUDANENSE* (Piper) Hitchc. Jour. Washington Acad. Sci. 17:147. 1927.

*Andropogon sorghum sudanensis* Piper, Proc. Biol. Soc. Washington 28:33. 1915.

*Holcus sorghum sudanensis* Hitchc. Proc. Biol. Soc. Washington 29:128. 1916.

*Sorghum sudanense* Stapf in Prain, Fl. Trop. Afr. 9:113. 1917.

*Holcus sudanensis* Bailey, Gentes Herb. 1:132. 1923.

A tall, more slender grass than *S. vulgare*, with large open panicles, the branches slender, naked below, loosely flowered; spikelets elliptic-lanceolate, usually awned. Similar to *S. halepense*, but annual.

Cultivated in America as a hay and forage plant. Introduced from Africa.

Sudan grass.

PANAMÁ: Las Sabanas, *Killip* 4324.

79. *SORGHASTRUM* Nash

*SORGHASTRUM* Nash in Britton, Man. 71. 1901.

*Chalcoelytrum* Lunell, Amer. Midl. Nat. 4:212. 1915.

Spikelets nearly terete, in pairs, one sessile, the other wanting, only the hairy



pedicel present; glumes subindurate, the first hairy, the margins partly enclosing the second; sterile and fertile lemmas hyaline, ciliate on the margins, the latter deeply lobed, awned from between the lobes, the awn usually geniculate, twisted.

Perennial with long narrow blades and narrow panicles of short few-jointed racemes, usually purplish or brownish, sometimes pale.

- |  |                          |
|--|--------------------------|
| a. Plants annual; culms slender at the base, decumbent, rooting at the lower nodes; spikelets mostly 4 mm. long, the articulation oblique, leaving a rather sharp callus; awns 2-4.5 cm. long..... | 1. <i>S. INCOMPLETUM</i> |
| aa. Plants perennial; culms coarse, erect; spikelets 5-6 mm. long, the callus rounded, blunt, the articulation leaving a cup-shaped pedicel; awns 1-1.5 mm. long.....                              | 2. <i>S. NUTANS</i>      |

1. *SORGHASTRUM INCOMPLETUM* (Presl) Nash, N. Amer. Fl. 17:130. 1912.

*Andropogon incompletus* Presl, Rel. Haenk. 1:342. 1830.

*Andropogon nutans* var. *incompletus* Hack. in DC. Monogr. Phan. 6:531. 1889.

Slender annual; culms erect or ascending from a somewhat decumbent base, sometimes rooting at the lower nodes, commonly 20-50 cm., but sometimes as much as 2 m. high, simple or branching from the base, glabrous, the nodes appressed-pubescent; sheaths rounded or keeled toward the summit, glabrous; ligule firm, 0.5-2 mm. long; blades commonly 6-15 cm. long, 2-4 mm. wide, but on larger plants as much as 25 cm. long and 8 mm. wide, pustulose or papillose-roughened, usually pilose on the upper surface, the margins scabrous; panicles 5-20 cm. long, the slender rather distant branches ascending, the secondary branches and peduncles of the short racemes very slender or filiform, flexuous or tortuous, the peduncles glabrous or sparsely covered with long hairs; spikelets 3.5-5 mm. long, the first glume usually truncate, the tip minutely hispidulous, hirsute on the back, sometimes only near the base; rachis joints and pedicels densely ciliate with white or yellowish hairs; awns 2-4.5 cm. long, twice-geniculate, the two lower segments tightly twisted, usually villous, dark brown.

Savannas and grassy fields and hillsides, Mexico to Colombia; tropical Africa.

CHIRIQUÍ: El Boquete, *Hitchcock* 8184, 8244; Río Dupí, *Pittier* 5227; between Cerro Vaca and Hato del Loro, *Pittier* 5385. COCLÉ: Olá, *Pittier* 5037. CANAL ZONE: between Fort Clayton and Corozal, *Standley* 29036, 29072. PANAMÁ: between Las Sabanas and Matías Hernández, *Standley* 31850; Juan Díaz, *Killip* 4224; Pacora River, *Killip* 4213; Río Tecúmen, *Standley* 26605, 29394.

2. *SORGHASTRUM NUTANS* (L.) Nash in Small, Fl. Southeast U. S. 66. 1903.

*Andropogon nutans* L. Sp. Pl. 1045. 1753.

*Andropogon avenaceus* Michx. Fl. Bor. Amer. 1:58. 1803.

*Andropogon ciliatus* Ell. Bot. S. C. & Ga. 1:144. 1816.

*Sorghum nutans* A. Gray, Man. 617. 1848.

*Sorghum avenaceum* Chapm. Fl. South. U. S. 583. 1860.

*Chrysopogon nutans* Benth. Jour. Linn. Soc. Bot. 19:73. 1881.

*Chrysopogon avenaceus* Benth. Jour. Linn. Soc. Bot. 19:73. 1881.

*Sorghum nutans* subsp. *avenaceum* Hack. in Mart. Fl. Bras. 2<sup>3</sup>:274. 1883.

*Sorghum nutans* subsp. *linnaeanum* Hack. in Mart. Fl. Bras. 2<sup>3</sup>:276. 1883.

*Andropogon albescens* Fourn. Mex. Pl. 2:56. 1886.

*Andropogon confertus* Trin. ex Fourn. Mex. Pl. 2:55. 1886.

*Andropogon nutans* var. *avenaceus* Hack. in DC. Monogr. Phan. 6:530. 1889.



- Andropogon nutans* var. *linnaeanus* Hack. in DC. Monogr. Phan. 6:531. 1889.  
*Chrysopogon nutans* var. *avenaceus* Coville & Branner, Rep. Geol. Surv. Ark. 4:234. 1891.  
*Chrysopogon nutans* var. *linnaeanus* Mohr, Bull. Torrey Club 24:21. 1897.  
*Sorghastrum avenaceum* Nash in Britton, Man. 71. 1901.  
*Andropogon linnaeanus* Scribn. & Kearn. ex Scribn. & Ball, U. S. Dept. Agr. Div. Agrost. Bull. 24:40. 1901.  
*Sorghastrum linnaeanum* Nash in Small, Fl. Southeast. U. S. 66. 1903.  
*Holcus nutans* Kuntze ex Stuck. Anal. Mus. Nac. Buenos Aires 11:48. 1904.  
*Holcus nutans* var. *avenaceus* Hack. ex Stuck. Anal. Mus. Nac. Buenos Aires 11:48. 1904.  
*Chalcoelytrum nutans* Lunell, Amer. Midl. Nat. 4:212. 1915.

Perennial; culms densely tufted, erect, 1–2 m. high, glabrous, the nodes appressed-pubescent or hirsute; sheaths rounded, glabrous, usually much shorter than the internodes, auriculate; ligule 1–5 mm. long, the margins fused with the auricles of the sheath; blades elongate, 5–10 mm. wide, the margins scabrous or hispid; panicles 15–30 cm. long, the branches in rather distant fascicles, ascending, slender, straight or somewhat curved, at least the lower ones naked toward the base, glabrous or sometimes villous in the axils; secondary branches and peduncles of the racemes straight or a little flexuous, not tortuous; spikelets 5–6 mm. long, golden to reddish-brown, sparsely hirsute; awns 1–1.5 cm. long, once or obscurely twice-geniculate, tightly twisted, scabrous or minutely hispidulous.

Open grassy hillsides, fields, and plains, United States to Panama.

CHIRIQUÍ: San Felix, Pittier 5231. This specimen differs from typical material from the United States in having smaller spikelets and more prominently hispid margins of the blades.

#### 80. TRACHYPOGON Nees

TRACHYPOGON Nees, Agrost. Bras. 341. 1829.

Spikelets in pairs at the nodes of a slender continuous rachis, one nearly sessile, staminate awnless, the other pedicellate, perfect, long-awned; pedicel of the perfect spikelet obliquely disarticulating near the base, forming a sharp bearded callus below the spikelet; first glume of perfect spikelet firm, rounded on the back, several-nerved, obtuse; second glume firm, obscurely nerved; fertile lemma narrow, extending into a stout, twisted, geniculate or flexuous, often plumose awn; sessile spikelet as large as the fertile spikelet, persistent, awnless.

Tufted perennials with terminal racemes, solitary, or few approximate on a short axis.

1. TRACHYPOGON SECUNDUS (Presl) Scribn. U. S. Dept. Agr. Div. Agrost. Circ. 32:1. 1901.

*Heteropogon secundus* Presl, Rel. Haenk. 1:335. 1830.

*Andropogon secundus* Kunth, Rév. Gram. 1: Suppl. XXXIX. 1830.

*Trachypogon plumosus* var. *montufari* subvar. *secundus* Hack. ex Henr. Med. Rijks Herb. Leiden 40:40. 1921.

Perennial; culms densely tufted, erect, 1–1.5 m. high, the nodes densely bearded; sheaths glabrous, auriculate; ligule 5–12 mm. long, firm, the margins



fused with the auricles of the sheath; blades elongate, 2-5 mm. wide, flat or loosely rolled, attenuate, narrowed to an almost petiole-like base, scabrous, especially on the margins; racemes 1-2, 10-20 cm. long; fertile spikelets 10-12 mm. long including the sharp, bearded callus; first glume rather densely pubescent to nearly glabrous; awns 5-7 cm. long, the two lower segments conspicuously plumose.

Dry, grassy or rocky hillsides, Mexico to Panama.

CHIRIQUÍ: El Boquete, *Hitchcock* 8188, 8330. CANAL ZONE: between Panamá and Corozal, *Hitchcock* 9195; Ancón Hill, *Killip* 4195; *Standley* 25198, 26348. PANAMÁ: Taboga Island, *Hitchcock* 8090; *Killip* 4144; *Standley* 28008.

### 81. ELYONURUS Humb. & Bonpl.

ELYONURUS Humb. & Bonpl. ex Willd. Sp. Pl. 4:941. 1806.

Spikelets in pairs, at the nodes of a tardily disarticulating rachis, one sessile, perfect, the other pedicellate, staminate, similar to the sessile one but smaller, the rachis and pedicels thickened, densely villous; glumes rather firm, rounded on the back, sharply keeled, acuminate, entire or bifid, the margins inflexed, clasping the second glume; second glume acuminate; sterile lemma hyaline, narrow, nearly as long as the glumes; fertile lemma hyaline, awnless, the palea obsolete.

Tufted erect perennials with narrow or involute blades and solitary, terminal, often woolly racemes.

#### 1. ELYONURUS TRIPSACOIDES Humb. & Bonpl. ex Willd. Sp. Pl. 4: 941. 1806.

Perennial; culms densely tufted, erect, 60-100 cm. high, glabrous, sometimes with a pubescent line down one side; sheaths shorter than the internodes, rounded, glabrous, or papillose-pilose or villous toward the summit; ligule membranaceous, minutely ciliate, less than 0.5 mm. long; blades elongate, 1-3 mm. wide, flat or folded, usually villous on the upper surface at the base, the margins scabrous; raceme 5-12 cm. long, the rachis and pedicels densely villous; sessile spikelet 5-8 mm. long, the back glabrous, the margins densely short-ciliate, narrowly winged toward the summit, the tip deeply bilobed, the lobes narrow, acuminate; pedicellate spikelet similar to the sessile but smaller and not as deeply lobed.

Savannas and grassy hillsides, southern United States to Bolivia and Argentina.

CHIRIQUÍ: El Boquete, *Hitchcock* 8296. COCLÉ: Olá, *Pittier* 5051.

ELYONURUS TRIPSACOIDES var. CILIARIS (H.B.K.) Hack. in DC. Monogr. Phan. 6:333. 1889.

*Elyonurus ciliaris* H.B.K. Nov. Gen. & Sp. 1:193. 1816.

Differing from *E. tripsacoides* only in the pubescent or villous spikelets.

Mexico to Venezuela.

CHIRIQUÍ: El Boquete, *Hitchcock* 8254.



## 82. ISCHAEMUM L.

ISCHAEMUM L. Sp. Pl. 1049. 1753.

Spikelets in pairs, all alike, perfect, but the pedicellate spikelet not always fruitful, the rachis and pedicels of the disarticulating racemes thickened; first glume indurate and rounded below, flattened, herbaceous and sometimes winged above, often cross-wrinkled or ridged, the narrow margins sharply inflexed; sterile lemma hyaline, as long as the glumes, enclosing a well-developed palea and staminate flower; fertile lemma hyaline, deeply bifid, awned from between the teeth, the awn geniculate, tightly twisted below the bend.

Branching annuals or perennials, often decumbent-spreading, with flat blades and rather thick racemes, digitate or flabellate at the ends of the branches.

- a. Plants annual; first glume strongly transversely ridged..... 1. I. RUGOSUM  
 aa. Plants perennial; first glume sometimes wrinkled, but not transversely  
 ridged..... 2. I. CILIARE

1. ISCHAEMUM RUGOSUM Salisb. Icon. Stirp. Rar. 1. *pl. I.* 1791.

Annual; culms erect or decumbent at the base, rather freely branching from nearly all the nodes, the nodes bearded; sheaths rather loose, keeled toward the summit, glabrous or sparsely papillose-pilose near the summit; ligule 2–3 mm. long; blades mostly 10–15 cm. long, 6–12 mm. wide, acuminate, narrowed toward the base, sometimes petiole-like, the margins very scabrous; racemes in pairs, appressed together and appearing as if one when young, 3–10 cm. long, terminal on the main culm and branches, long-exserted from the upper bladeless sheath, the rachis thick, readily disarticulating, ciliate on the outer edges; spikelets 3–4 mm. long, obtuse, the summit membranaceous, otherwise indurate with 3–5 strong transverse ridges; awns 1.5 cm. long, tightly twisted below, loosely twisted above the bend.

A common weed in fields, clearings, brushy slopes, and waste ground. Introduced in Panama, Cuba, and Jamaica; a native of the Old World.

CANAL ZONE: France Field, *Standley 28587*; Gatún, *Hitchcock 9183*; New Frijoles, *Pittier 6831*; Barro Colorado Island, *Standley 40951*; Darién Station, *Standley 31509*; Tabernilla, *Hitchcock 8381*; Culebra, *Standley 26029*; Summit, *Standley 26914, 27329*; *D. H. Popenoe 19*; between Miraflores and Pedro Miguel, *Pittier 2506*; between Fort Clayton and Corozal, *Standley 29097*; Balboa Heights, *Killip 4184*. PANAMÁ: Abalaba, *Killip 4268*.

2. ISCHAEMUM CILIARE Retz. Obs. Bot. 6:36. 1791.

Perennial, occasionally stoloniferous; culms decumbent-spreading, rooting at the nodes, branching, commonly 15–40 cm. long, the nodes antrorsely bearded or sometimes glabrous; sheaths loose, glabrous to papillose-pilose, especially on the margins, usually shorter than the internodes, the uppermost bladeless or with a much-reduced blade; blades 3–10 cm. long, 4–8 mm. wide, acuminate, narrowed toward the base, almost petiole-like, pilose on both surfaces, the margins scabrous; racemes 1 or usually 2, 3–5 cm. long, finally spreading, the rachis and sterile pedicels thick, ciliate on the margins, the hairs on the inner margins short, white,



those on the outside margins much longer, yellowish; spikelets 4 mm. long, the first glume acute or mucronate, sometimes minutely lobed, indurate at the base, thinner and prominently nerved toward the summit; awns about 8 mm. long, geniculate, the lower segment tightly twisted, the upper loosely twisted.

Introduced from Asia in Panama and British Guiana. Common in lawns; well established around Balboa.

CANAL ZONE: Ancón, *Hitchcock* 22941; *Piper* 5281; *D. H. Popenoe* 27; Balboa, *Standley* 26980, 30871.

### 83. HACKELOCHLOA Kuntze

HACKELOCHLOA Kuntze, *Rev. Gen. Pl.* 2:776. 1891.

*Rytilix* Raf. *Bull. Bot. Seringe* 1:219. 1830.

Spikelets very dissimilar, in pairs at the nodes of a disarticulating rachis, the rachis segments and pedicels grown together, more or less clasped by the margins of the first glume of the sessile spikelet; sessile spikelet globose, the first glume indurate, alveolate; pedicellate spikelet conspicuous, staminate or sterile, membranaceous, flattened, the first glume broad, rather strongly nerved, acute, the keels winged.

Annual grasses with flat blades and rather numerous short solitary racemes on the flowering branches from the middle and upper nodes.

1. HACKELOCHLOA GRANULARIS (L.) Kuntze, *Rev. Gen. Pl.* 2:776. 1891.

*Cenchrus granularis* L. *Mant. Pl.* 2:575. 1771.

*Manisuris granularis* Swartz, *Prodr. Veg. Ind. Occ.* 25. 1788.

*Rytilix granularis* Skeels, *U. S. Dept. Agr. Bur. Pl. Ind. Bull.* 282:20. 1913.

Annual; culms erect or ascending, 30–100 cm. high, freely branching, more or less papillose-hispid, especially below the nodes; sheaths short, densely and conspicuously papillose-hispid; blades mostly 5–15 cm. long, 5–12 mm. wide, flat, papillose-hirsute on both surfaces, the margins ciliate; racemes numerous, short, partly enclosed in the subtending spathe; fertile spikelet 1 mm. long, the pedicellate spikelet 2 mm. long.

A common weed in open ground and waste places in tropical regions around the world.

CHIRIQUÍ: El Boquete, *Hitchcock* 8294; David, *Hitchcock* 8360. COCLÉ: Olá, *Pittier* 5068. CANAL ZONE: Culebra, *Hitchcock* 7929; between Miraflores and Pedro Miguel, *Pittier* 3965; Balboa, *Hitchcock* 8006; *Standley* 25288, 26438. PANAMÁ: Arraiján, *Woodson*, *Allen & Seibert* 1377; Río Tapia, *Standley* 41183; Chorrera, *Hitchcock* 8152; Taboga Island, *Killip* 4153.

### 84. MANISURIS L.

MANISURIS L. *Mant. Pl.* 2:164, 300. 1771.

Spikelets in pairs at the nodes of a thickened, readily disarticulating rachis, one sessile and perfect, the other pedicellate and sterile, the sessile spikelet appressed to the rachis, forming a subcylindrical raceme; first glume of sessile spikelet in-



durate, obtuse, winged, smooth or variously wrinkled or pitted; sterile lemma, fertile lemma and palea hyaline, the fertile lemma awnless; pedicellate spikelet smaller and less indurate than the sessile, sterile.

Slender perennials with narrow flat blades and solitary subcylindrical racemes.

- |   |              |
|---|--------------|
| a. First glume of sessile spikelet 3-4 mm. long, smooth or obscurely pitted; flowering branches compound..... | 1. M. AURITA |
| aa. First glume of sessile spikelet 4-5 mm. long, prominently pitted in lines; flowering branches simple..... | 2. M. RAMOSA |

1. *MANISURIS AURITA* (Steud.) Kuntze, Rev. Gen. Pl. 3<sup>3</sup>:356. 1898.

*Rottboellia aurita* Steud. Syn. Pl. Glum. 1:361. 1854.

Perennial; culms densely tufted, erect, 1-1.5 m. high, glabrous; sheaths compressed, keeled, glabrous, the lower ones longer, the upper ones shorter than the internodes; ligule less than 0.5 mm. long, membranaceous, minutely ciliate; blades elongate, conduplicate, hirsute on the upper surface near the base, the margins scabrous; flowering branches from the middle and upper nodes, appressed, forming a long, narrow inflorescence; racemes 3-10 cm. long, partly included in the spathes, the rachis and sterile pedicels auriculate at the summit, the auricles prominent or sometimes very small; sessile spikelets 3-4 mm. long, smooth or obscurely pitted, rather broadly winged; pedicellate spikelet narrower but much shorter than the sessile.

Marshes and savannas, Costa Rica to Bolivia and Argentina.

CHIRIQUÍ: El Boquete, Woodson & Schery 740. PANAMÁ: Chepo, Pittier 4649.

2. *MANISURIS RAMOSA* Hitchc. Proc. Biol. Soc. Washington 40:88. 1927.

*Rottboellia ramosa* Benth. ex Hemsl. Biol. Centr.-Amer. Bot. 3:521. 1885. Not *R. ramosa* Cav., 1801.

*Apogonia ramosa* Fourn. Mex. Pl. 2:63. 1886.

*Rottboellia aurita* var. *stigmosa* Hack. in DC. Monogr. Phan. 6:311. 1889.

*Coelorachis ramosa* Nash, N. Amer. Fl. 17:86. 1909.

Differing from the preceding in having fewer, thicker racemes; sessile spikelets 4-5 mm. long, indurate, rather prominently pitted in lines, broadly winged, obtuse, bilobed; pedicellate spikelet commonly much smaller than the sessile, broadly winged.

Low wet ground, Mexico to Colombia.

PANAMÁ: Chepo, Dormisolo, Pittier 4649.

## 85. TRIPSACUM L.

TRIPSACUM L. Syst. Nat. ed. 10. 2:1261. 1759.

Monoecious, the staminate and pistillate spikelets in the same inflorescence; staminate spikelets 2-flowered, in pairs at the nodes of a continuous rachis, one sessile, the other subsessile or pedicellate; glumes membranaceous, equal, many-nerved, the first 2-keeled, the margins rather sharply inflexed; pistillate spikelets solitary on opposite sides on the lower part of the same rachis, sunken in the thickened, hardened disarticulating segments, composed of 1 fertile floret and a sterile



lemma; first glume coriaceous, rounded, the margins nearly enclosing the spikelet, sterile lemma, fertile lemma, and palea hyaline, each successively smaller.

Coarse perennials with usually broad flat blades and 1 to several racemes in terminal and axillary inflorescences.

1. *TRIPSACUM LANCEOLATUM* Rupr. ex Fourn. Mex. Pl. 2:68. 1886.

*Tripsacum lemmoni* Vasey, Contr. U. S. Nat. Herb. 3:6. 1892.

*Tripsacum dactyloides* var. *lemmoni* Beal, Grasses N. Amer. 2:19. 1896.

*Tripsacum dactyloides hispidum* Hitchc. Bot. Gaz. 41:295. 1906.

Perennial; culms in large, tough, hard clumps 1–2 m. high; blades elongate, attenuate, flat, 0.5–2.5 cm. wide, pubescent or pilose on the upper surface, the margins scabrous; racemes 1 to several; staminate spikelets sessile or subsessile, 5–8 mm. long; pistillate spikelets 5–6 mm. long.

Open ground and brushy slopes, Mexico to Panama.

CANAL ZONE: Sosa Hill, Balboa, *Standley 26430*. This specimen is the basis for the record of *T. dactyloides* in Panama in Hitchcock, Grasses of Central America.

*Tripsacum latifolium* Hitchc. and *T. fasciculatum* Trin. are reported as cultivated in Panama. The first is a very coarse plant with blades as much as 6 cm. wide, and commonly 2–4, elongate, more or less flexuous racemes, the staminate spikelets sessile or subsessile, mostly 3–4 mm. long. *T. latifolium* is also very coarse with broad blades, the lower ones long-petiolate; some staminate spikelets usually pedicellate.

#### 86. COIX L.

COIX L. Sp. Pl. 972. 1753.

Monoecious, the staminate and pistillate spikelets in the same inflorescence; staminate spikelets 2-flowered in 2's or 3's at each joint of a slender continuous rachis, 2 sessile, the other pedicellate, sometimes wanting; first glume many-nerved, 2-keeled, the keels broadly winged above the middle, the margins narrow and not much inflexed; pistillate spikelets 3 together enclosed in a very hard white or grayish, bead-like involucre or modified bract, the peduncle of the staminate raceme protruding from the orifice at the apex.

Broad-leaved annuals with numerous inflorescences on long stout peduncles, solitary or fascicled in the upper sheaths.

1. *COIX LACRYMA-JOBI* L. Sp. Pl. 972. 1753.

Culms freely branching, 1 m. or more high; blades as much as 50 cm. long, the upper ones commonly 10–20 cm. long, 2–3.5 cm. wide, rounded or cordate-clasping at the base; staminate part of the inflorescence 2–4 cm. long, the spikelets 8–10 mm. long; beads or sheathing bracts about 1 cm. long, smooth and shining.

Lágrimas de San Pedro; lagrimas de Job.

Introduced from the Old World. Cultivated for ornament, and found as an escape in moist places throughout tropical America.



CHIRIQUÍ: El Boquete, *Davidson 669*. CANAL ZONE: Frijoles, *Standley 31468*; Miraflores Lake, *Allen 171*; between Gamboa and Cruces, *Pittier 3780*; Las Cascadas Plantation, *Standley 29579*; Empire, *Hunter & Allen 768*; Culebra, *Pittier 4777*; *Hitchcock 7917*; Balboa, *Standley 25477*. DARIÉN: Pinogana, *Allen 941*.

## 87. ZEA L.

ZEA L. Sp. Pl. 971. 1753.

Spikelets unisexual; staminate spikelets 2-flowered, in pairs on one side of a continuous rachis, one nearly sessile, the other pedicellate; glumes membranaceous, acute; pistillate spikelets sessile, in pairs, consisting of 1 fertile and 1 sterile floret, the latter sometimes developed as a second fertile floret; glumes broad, rounded or emarginate at apex; sterile lemma similar to the fertile, the palea present; style very long and slender, stigmatic along both sides well toward the base.

Tall annual, with broad, conspicuously distichous blades, monoecious inflorescences, the staminate flowers in spike-like racemes, these numerous, forming large spreading panicles (tassels) terminating the stems, the pistillate inflorescences in the axils of the leaves, the spikelets in 8–16 or even as many as 30 rows on a thickened, almost woody axis (cob), the whole enclosed in numerous large foliaceous bracts (husks), the long styles (silk) protruding from the top as a silky mass of threads. Only one species in numerous varieties.

## 1. ZEA MAYS L. Sp. Pl. 971. 1753.

Culms 1–2 m. high; blades as much as 10 cm. wide, recurved; staminate racemes 10–15 cm. long, the central erect, the lateral drooping; pistillate inflorescence or ear and the grains or kernels variable according to the variety.

The original wild form is unknown but was probably a native of the Mexican or Central American highlands. Now commonly cultivated throughout warm and temperate regions.

Corn, maize, or mais.

## UNIDENTIFIED NAMES

ERAGROSTIS ACUTIFLORA  $\beta$ . HUMILIOR Presl, Rel. Haenk. 1:277. 1830.

ALOPECURUS LATIFOLIUS Cav., Descr. Pl. 87. 1802.